

First Year Evaluation Report Self-Generation Incentive Program

Submitted to:

Southern California Edison
2131 Walnut Grove Avenue
Rosemead, California 91770



June 28, 2002

Table of Contents

Executive Summary	ES-1
ES.1 Program Description	ES-1
ES.2 Objectives of the First-Year Program Evaluation	ES-3
ES.3 Work Plan Overview.....	ES-3
ES.4 Program Goals, Rationale, Objectives and Evaluation Criteria	ES-3
ES.5 Data Collection.....	ES-5
ES.6 Program Status of 2001 Participants.....	ES-6
ES.7 Characterization of 2001 Participants	ES-9
ES.8 Process Assessment Findings	ES-10
<i>Effectiveness of Joint Delivery Implementation Approach.....</i>	<i>ES-10</i>
<i>Program Operational Efficiency Issues.....</i>	<i>ES-10</i>
<i>Program Acceptance and Satisfaction.....</i>	<i>ES-11</i>
<i>Program Awareness.....</i>	<i>ES-12</i>
<i>Administrator Marketing Efforts.....</i>	<i>ES-12</i>
<i>Effectiveness of Program Design upon Removing Market Barriers.....</i>	<i>ES-12</i>
<i>Effectiveness of Program Design Upon Leveraging Market Incentives.....</i>	<i>ES-13</i>
ES.9 Administrator Coordination of Participation in Other Incentive Programs.....	ES-14
ES.10 Recommendations	ES-15
<i>Program Design Recommendations</i>	<i>ES-15</i>
<i>Process Recommendations for the Program Administrator Working Group</i>	<i>ES-16</i>
<i>Future Evaluation Needs.....</i>	<i>ES-18</i>
1 Introduction	1-1
1.1 Program Description	1-2
1.2 First-Year Evaluation Objectives.....	1-3
1.3 Report Organization.....	1-3
2 Program Evaluation Work Plan.....	2-1
2.1 Develop and Refine Self-Generation Program Evaluation Plan (Task 1)	2-2
<i>Self-Generation Program Evaluation Criteria.....</i>	<i>2-5</i>
2.2 Task 2: Statistical Methods and Implementation of System Sampling Procedures	2-6
<i>Program Surveys – Sample Design Implementation.....</i>	<i>2-7</i>
<i>Program Monitoring and Verification Sample Design Implementation</i>	<i>2-10</i>
2.3 Program Status and Participant Characterization (Task 3)	2-10
Task 3.1. <i>Compile Program Administrator Maintained Data.....</i>	<i>2-11</i>
Task 3.2. <i>Surveys of Program Applicants, Nonparticipants and Supply Channel Stakeholders</i>	<i>2-11</i>
Task 3.3. <i>Recommend Additional Administrator Tracking System Variables and Data Management Specifications.....</i>	<i>2-12</i>

2.4 Compile and Summarize Other Incentives Program Participation	
(Task 4)	2-12
Task 4.1. Identify Other Potential Incentive Programs.....	2-13
Task 4.2. Survey of Program Participants – Other Program Incentives	2-13
Task 4.3. Summarize Program Participation for all Participants.....	2-13
2.5 Determine System Operational Characteristics (Task 5)	2-14
Introduction.....	2-14
Task 5.1. Compile and Summarize Electrical Energy Production by TOU	
Periods and Technology-Specific Factors.....	2-14
Task 5.2. Compile and Summarize Electrical Demand Reduction by TOU	
Periods and Technology-Specific Factors.....	2-15
Task 5.3. Determine Operating and Reliability Statistics – Availability and	
Capacity Factors.....	2-17
Task 5.4. Determine Compliance with Thermal Energy Utilization and System	
Efficiency Program Requirements	2-18
Task 5.5. Compliance with Program Reliability Criteria	2-18
Task 5.6: Determine Compliance of Level 1 Systems with Renewable Fuel	
Usage Requirement.....	2-19
2.6 Task 6: Implement On-Site Monitoring, System Data Collection,	
and Field Verification/Inspections.....	2-19
Task 6.1: Program Incentive Level 1 Monitoring Requirements	2-20
Task 6.2: Level Two Fuel Cell Monitoring.....	2-23
Task 6.3: Incentive Level 3 Monitoring Requirements	2-24
Equipment Specifications and Costs	2-24
Task 6.4: Monitoring Systems Data Collection	2-27
Task 6.5: Administrator Field Verification/Inspection Review.....	2-27
2.7 Recommendations to Improve On-Peak Load Impacts (Task 7).....	2-27
2.8 Task 8: Perform a Comparative Program Administrator Impact and	
Process Assessment (Utility vs. Non-Utility).....	2-28
Proximate Indicator Analysis.....	2-28
Operational Data Comparison.....	2-29
In-Depth Surveys	2-29
2.9 Task 9: Annual Program Evaluation Reports	2-29
2.10 Task 10: Other Project Deliverables and Reporting.....	2-29
3 First Year Program Data Collection Activities	3-1
3.1 Overview.....	3-1
3.2 Program Administrator Program Tracking Databases.....	3-1
3.3 Program Administrator Interviews	3-2
3.4 2001 Host Customer Survey.....	3-3
2001 Host Customer Sample Design.....	3-4
3.5 Nonparticipant Survey.....	3-7
3.6 Supplier Surveys.....	3-13
4 Program Status and Participant Characterization.....	4-1
4.1 Overview.....	4-1
4.2 Summary of 2001 Projects.....	4-2
Active Projects.....	4-5
Inactive Projects.....	4-11
4.3 Host Customer Characterization.....	4-11
Building Type.....	4-12
Number of Employees.....	4-12

<i>Monthly Electric Bill</i>	4-14
<i>Square Footage</i>	4-15
<i>Annual Peak Demand</i>	4-16
<i>Use of Distributed Generation System as Emergency Backup</i>	4-17
<i>Level of Host Customer Involvement with the Project</i>	4-17
<i>Distributed Generation Systems by Sector</i>	4-19
4.4 Supplier Characterization	4-19
<i>Manufacturers</i>	4-20
<i>Third Party Applicants</i>	4-23
4.5 Program Administrator Tracking Data Review and Recommendations	4-27
<i>Current Content of the Administrator Tracking and Compliance Data</i>	4-27
<i>Recommended Changes and Additions to the Program Administrator Tracking Data</i>	4-28
<i>Proposed Schedule for Administrator Tracking Data Updates</i>	4-32
4.6 Summary	4-32
<i>Program Status</i>	4-32
<i>Participant Characterization</i>	4-33
5 First Year Process Evaluation	5-1
5.1 Introduction	5-1
5.2 Effectiveness of Joint Delivery Implementation Approach	5-1
5.3 Program Operational Efficiency Issues	5-3
<i>Familiarity with and Clarity of Application Materials and Instructions</i>	5-3
<i>Responsiveness of Program Administrators to Applicants' Questions</i>	5-13
<i>Adequacy of the SelfGen Incentive Program Application 90-Day and One-Year Deadlines</i>	5-18
<i>Level of Ease/Difficulty for System Installation and for Meeting Application Milestones</i>	5-29
5.4 Program Acceptance and Satisfaction	5-34
5.5 Program Awareness	5-37
<i>Nonparticipant Host Customers</i>	5-37
<i>Host Customers Applicants</i>	5-39
<i>Third Party Applicants</i>	5-40
5.6 Administrator Marketing Efforts	5-41
<i>Marketing Expenditures and Budget</i>	5-41
<i>Marketing Strategies and Activities</i>	5-41
<i>Lessons Learned from Marketing Strategies</i>	5-43
<i>Summary of Administrator Marketing Recommendations</i>	5-44
5.7 Barriers to Program Participation	5-44
5.8 Effectiveness of Program Design upon Removing Market Barriers	5-47
<i>Supply Channel Perspective</i>	5-48
5.9 Effectiveness of Program Design Upon Leveraging Market Incentives	5-49
<i>Incentive Budget by Category</i>	5-50
5.10 Summary of Major Process-Related Findings and Recommendations	5-51
<i>Effectiveness of Joint Delivery Implementation Approach</i>	5-51
<i>Program Operational Efficiency Issues</i>	5-52
<i>Program Acceptance and Satisfaction</i>	5-54
<i>Program Awareness</i>	5-54
<i>Administrator Marketing Efforts</i>	5-55

<i>Barriers to Program Participation</i>	5-56
<i>Effectiveness of Program Design upon Removing Market Barriers</i>	5-57
<i>Effectiveness of Program Design upon Leveraging Market Incentive</i>	5-57
6 Other Incentive Program Participation	6-1
6.1 Introduction	6-1
6.2 Background.....	6-1
6.3 Identification of Other Potential Incentive Programs	6-2
<i>Federally Funded Incentive Programs</i>	6-3
<i>State-Funded Incentive Programs</i>	6-4
<i>IOU, Local Utility, and/or Local Government Funded Programs</i>	6-6
6.4 Summary of Program Participation	6-7
<i>Fuel Cells</i>	6-7
<i>Photovoltaics</i>	6-8
<i>Microturbines</i>	6-8
<i>Internal Combustion Engines</i>	6-9
<i>Summary of Other Programs</i>	6-9
6.5 Conclusions	6-10
7 On-Site Field Verification and Inspection Activities	7-1
7.1 Review of Administrators Verification Activities.....	7-1
<i>Summary</i>	7-1
<i>On-Site Verification Process</i>	7-1
<i>Summary</i>	7-2
<i>Future Evaluation Activities</i>	7-2
8 System Monitoring and Operational Data Collection	8-1
8.1 Waste Heat Recovery	8-2
8.2 Reliability Requirements	8-3
8.3 Fuel Use Requirements	8-3
9 System Operational Characteristics by Administrator Service Area	9-1
10 Conclusions and Recommendations	10-1
10.1 Introduction	10-1
10.2 Conclusions from the First Year Process Evaluation	10-3
<i>Program Status</i>	10-3
<i>Participant Characterization</i>	10-3
<i>Process Evaluation</i>	10-4
<i>Other Incentive Program Participation</i>	10-9
10.3 Program Recommendations	10-10
<i>Program Design Recommendations</i>	10-10
<i>Process Recommendations for the Program Administrators Working Group</i>	10-12
<i>Future Evaluation Needs</i>	10-18
Appendix A Program Administrator Interview Guide	A-1
Appendix B Host Customer Interview Guides	B-1
Appendix C Supply Channel Interview Guide	C-1

Appendix D Nonparticipant Telephone Survey Instrument..... D-1

Appendix E Participant Characterization Summarized Cross Tabulations..... E-1

Appendix F Process Assessment Summarized Cross TabulationsF-1

Appendix G Listing of Other Distributed Generation Incentive Programs G-1

Appendix H Listing of Program Administrator Marketing Materials..... H-1

H.1 Administrator 1 H-1

H.2 Administrator 2 H-1

H.3 Administrator 3 H-1

H.4 Administrator 4 H-2

List of Figures

Figure ES-1: Distributed Generation Technology by Major Sector for Host Customers..... ES-9

Figure 2-1: ISO System Demand and Photovoltaic Supply on Three Summer Peak Days.....2-16

Figure 4-1: Distribution of 2001 Projects by Application Status and Incentive Level4-4

Figure 4-2: Distribution of Potential Installed kW Capacity of 2001 Projects by Application Status and Incentive Level.....4-4

Figure 4-3: Number of Host Customers by Building Type4-13

Figure 4-4: Average Number of Employees or Occupants at the Host Customer Facility4-13

Figure 4-5: Average Monthly Electric Bill for Host Customers.....4-14

Figure 4-6: Average Square Footage for Host Customers4-15

Figure 4-7: Average Annual Peak Demand for Host Customers4-16

Figure 4-8: Percent of Host Customers whose Distributed Generation System Provides Emergency Backup Power by Building Type.....4-17

Figure 4-9: Host Customers’ Level of Involvement with Application Process by Sector4-18

Figure 4-10: Distributed Generation Technology Applications by Sector4-19

Figure 4-11: Scope of Third Party Application Activity by Primary Technology4-25

Figure 4-12: Distribution of Typical Roles Performed by Third Party Applicants.....4-26

Figure 5-1: Host Customers’ Application Involvement.....5-5

Figure 5-2: Host Customers’ Application Involvement by Distributed Generation Technology5-5

Figure 5-3: Host Customers’ Application Involvement by Application Status5-6

Figure 5-4: Percent of Host Customers Who Reviewed the Application Materials by Application Involvement5-7

Figure 5-5: Percent of Host Customers who Found the Application Forms and Instructions to be Clear by Application Involvement.....5-8

Figure 5-6: Percent of Host Customers who found the Application Forms and Instructions to be Clear by Application Status5-8

Figure 5-7: Percent of Host Customers who found the Application Forms and Instructions to be Clear by Distributed Generation Technology5-9

Figure 5-8: Percent of Third Party Applicants who found the Application Forms and Instructions to be Clear by Distributed Generation Technology ...5-11

Figure 5-9: Percent of Third Party Applicants who found the Application Forms and Instructions to be Clear by Distributed Generation Technology and Number of Applications5-11

Figure 5-10: Percent of Host Customers who Indicated that the Program Administrators Provide Satisfactory Answers to Host Customer’s Questions by Application Status.....5-14

Figure 5-11: Percent of Host Customers who Indicated that the Program Administrators Provide Satisfactory Answers to Host Customer’s Questions by Distributed Generation Technology5-14

Figure 5-12: Percent of Host Customers who Indicated that the Program Administrator Contacted them after they Submitted an Application but before it was Approved by Application Status5-15

Figure 5-13: Percent of Host Customers who Indicated that there were Unnecessary Delays Caused by the Program Administrator, the Third Party, or Both by Application Status.....5-16

Figure 5-14: Percent of Host Customers who Indicated that there were Unnecessary Delays Caused by the Program Administrator, the Third Party, or Both by Distributed Generation Technology5-17

Figure 5-15: Percent of Host Customers who Indicated that the 90-Day Proof of Project Advancement Deadline is Sufficient by Application Status5-20

Figure 5-16: Percent of Host Customers who Indicated that the 90-Day Proof of Project Advancement Deadline is Sufficient by Distributed Generation Technology.....5-21

Figure 5-17: Percent of Host Customers who Indicated that the 90-Day Proof of Project Advancement Deadline is Sufficient by Building Type5-21

Figure 5-18: Percent of Host Customers who Indicated that the One-Year Deadline is Sufficient for Completing Installation of their proposed System by Application Status.....5-23

Figure 5-19: Percent of Host Customers who Indicated that the One-Year Deadline is Sufficient for Completing Installation of their Proposed System by Distributed Generation Technology5-23

Figure 5-20: Percent of Host Customers who Indicated that the One-Year Deadline is Sufficient for Completing Installation of their Proposed System by Building Type.....5-24

Figure 5-21: Percent of Third Party Applicants who Indicated that the 90-Day Proof of Project Advancement Deadline is Sufficient by Distributed Generation Technology5-26

Figure 5-22: Percent of Third Party Applicants who Indicated that the One-Year Deadline is Sufficient for Completing Installation of their Proposed System by Distributed Generation Technology5-27

Figure 5-23: Host Average Satisfaction by Applicant Type5-35

Figure 5-24: Host Average Satisfaction by Technology Type.....5-35

Figure 5-25: Average Satisfaction for Third Party Applicants by Distributed Generation Technology5-36

Figure 5-26: Average Rating of Popular Marketing Methods According to Nonparticipating Target Customers Not Aware of SelfGen Incentive Program (5 = very difficult and 1 = not at all difficult)5-38

Figure 5-27: How Nonparticipant Host Customers Learned About the SelfGen Incentive Program5-39

Figure 5-28: Summary of How Host Customers Learned About SelfGen Incentive Program5-40

List of Tables

Table ES-1: Summary of SelfGen Program Incentive Levels..... ES-2

Table ES-2: Evaluation Criteria of the California Self-Generation Incentive Program ES-4

Table ES-3: Summary of Active 2001 Projects ES-7

Table ES-4: Potential Installed Capacities for Active 2001 Projects..... ES-8

Table ES-5: Eligible Cost per Watt of Active 2001 Projects ES-8

Table ES-6: Participant vs. Program Contribution for Active Projects ES-8

Table 1-1: Summary of SelfGen Program Incentive Levels..... 1-2

Table 2-1: Evaluation Criteria of the SelfGen Incentive Program 2-6

Table 2-2: First-Year Supply Channel Survey Sample Design 2-8

Table 2-3: First Year Nonparticipant Survey Sample Design 2-9

Table 2-4: Estimated Program Participation..... 2-27

Table 3-1: Summary of 2001 SelfGen Incentive Program Host Customers Sample Design and Completed Surveys..... 3-6

Table 3-2: Electricity Consumption for the LADWP, SDG&E, PG&E, and SCE Electric Service Territories 3-8

Table 3-3: Summary of Surveyed Host Customers by Building Type..... 3-9

Table 3-4: Nonparticipant Survey Sample Design..... 3-11

Table 3-5: Third Party Applicants 3-16

Table 3-6: Manufacturers Represented in SelfGen projects..... 3-16

Table 4-1: Summary of Active 2001 Projects 4-7

Table 4-2: Potential Installed Capacities for Active 2001 Projects 4-8

Table 4-3: Eligible Cost of Active 2001 Projects..... 4-8

Table 4-4: Eligible Cost per Watt of Active 2001 Projects 4-8

Table 4-5: Basis for Incentive for Active Projects 4-10

Table 4-6: Participant vs. Program Contribution for Active Projects..... 4-10

Table 4-7: Summary of Inactive 2001 Projects..... 4-11

Table 4-8: Most Heavily Represented Equipment Manufacturers 4-21

Table 4-9: Full-Time Employees 4-22

Table 4-10: Number of Years in Business.....	4-22
Table 4-11: Third Party Applicants	4-24
Table 4-12: Full-time Employees.....	4-25
Table 4-13: Number of Years in Business.....	4-26
Table 4-14: Suggested Additional Tracking Data Variables	4-31
Table 5-1: Summary of Host Customers’ Reasons Why the 90-Day Deadline is Insufficient by distributed generation technology	5-22
Table 5-2: Summary of Host Customers’ Reasons Why the One-Year Deadline is Insufficient by distributed generation technology	5-24
Table 5-3: Summary of Third Party Applicants Reasons Why the 90-Day Proof of Project Advancement Deadline is Insufficient by Distributed Generation Technology	5-26
Table 5-4: Summary of third Party Applicants Reason Why the One Year Deadline is Insufficient by Distributed Generation Technology	5-28
Table 5-5: Average Level of Difficulty in Meeting Project Milestones – Active Host Customer Applicants (5 = very difficult and 1 = not at all difficult).....	5-31
Table 5-6: Average Level of Difficulty in Meeting Project Milestones – In Active Host Customer Applicants (5 = very difficult and 1 = not at all difficult).....	5-32
Table 5-7: Percent of Inactive Host Customer Applicants still likely to complete their Distributed Generation Project.....	5-32
Table 5-8: Average Level of Difficulty in Meeting Project Development Milestones – Program Administrators Perceptions of Applicants (5 = very difficult and 1 = not at all difficult)	5-34
Table 6-1: Summary of Other Programs Influencing First Costs	6-10
Table 10-1: Evaluation Criteria of the California SelfGen Incentive Program	10-2
Table 10-2: Suggested Additional Program Tracking Data Variables	10-15

Executive Summary

Assembly Bill 970, signed into law in September 6, 2000, required the California Public Utilities Commission (CPUC) to initiate certain load control and distributed generation program activities, including financial incentives to eligible customers. The Self-Generation Incentive Program (SelfGen Incentive Program) was adopted in concept on March 27, 2001 by the CPUC under Decision 01-03-073. The program provides financial incentives for the installation of new qualifying electric generation equipment that will meet all or a portion of the electric needs of a customer's facility. Although there is some overlap with the program's renewable technologies, the SelfGen Incentive Program is designed to complement the California Energy Commission's (CEC's) existing Emerging Renewables Buydown Program. This is accomplished by focusing on the commercial/industrial/agricultural market sectors and through the inclusion of select self-generation technology using nonrenewable fuel up to 1,000 kW in generating capacity.¹

Under the direction of CPUC Decision 01-03-073, the SelfGen Incentive Program is administered on a regional joint-delivery basis through three investor-owned utilities (Southern California Edison, Pacific Gas & Electric, Southern California Gas Company) and one non-utility administrator entity, the San Diego Regional Energy Office (SDREO).² Coordination with the CEC Buydown Program occurs through the Statewide SelfGen Incentive Program Working Group (hereinafter referred to as Working Group) and through a separately managed statewide self-generation program compliance database.

ES.1 Program Description

The SelfGen Incentive Program is offered throughout most of the state of California, specifically within the service areas of Southern California Edison, Pacific Gas & Electric, Southern California Gas Company, and San Diego Gas & Electric. The Program will continue to accept applications through December 31, 2004, subject to availability of Administrator Program Funds. Decision 01-03-073 authorized an annual statewide allocation of \$125 million, including all program administration costs.

¹ A subsequent CPUC Ruling increased the allowed maximum system size to 1,500 kW – although the maximum incentive basis remains capped at 1,000 kW.

² SDREO is the Program Administrator for San Diego Gas & Electric customers.

“Self-generation” refers to distributed generation technologies (microturbines, small gas turbines, wind turbines, photovoltaics, fuel cells and internal combustion engines) installed on the customer’s side of the utility meter that provide electricity for a portion or all of that customer’s electric load. Under the program, financial incentives will be provided to the targeted distributed generation technologies as summarized in Table ES-1. As shown, these incentives range between \$1.00 and \$4.50 per watt depending on the technology involved.

Table ES-1: Summary of SelfGen Program Incentive Levels

Incentive Category	Maximum Incentive Offered (\$/watt)	Maximum Incentive as a % of Eligible Project Cost	Minimum System Size (kW)	Maximum System Size Incentivized (kW)	Eligible Generation Technologies
Level 1	\$4.50	50%	30	1,000	<ul style="list-style-type: none"> ■ Photovoltaics ■ Fuel Cells¹ ■ Wind Turbines
Level 2	\$2.50	40%	None	1,000	<ul style="list-style-type: none"> ■ Fuel Cells²
Level 3	\$1.00	30%	None	1,000	<ul style="list-style-type: none"> ■ Microturbines³ ■ Internal combustion engines and small gas turbines⁴

- 1 Operating on renewable fuel.
- 2 Operating on non-renewable fuel.
- 3 Using sufficient waste heat recovery and meeting reliability criteria.
- 4 Both utilizing sufficient waste heat recovery and meeting reliability criteria.

PG&E, SCE, and SoCalGas will administer programs in their service territories. Within the SDG&E service territory, the program is administered (via contractual arrangement) through the San Diego Regional Energy Office (SDREO).

Initially, the \$100 million statewide annual incentive budget is allocated equally amongst program Incentive Levels 1, 2, and 3. As needed, the incentive budgets may be reallocated according to need, with the exception that any Level 1 renewable allocations may not be transferred to Level 2 or 3 nonrenewable technologies without the approval of the CPUC via an advice letter filing.

ES.2 Objectives of the First-Year Program Evaluation

This first year evaluation of the SelfGen Incentive Program is performed to fulfill specific measurement and evaluation (M&E) requirements identified in CPUC Decision 01-03-073.³ According to the Decision (§4.6, pp.37), Program Administrators “are required to perform program evaluations and load impact studies to verify energy production and system peak demand reductions.” In addition, after the second (2002) program year, the Program Administrators “are required to conduct an independent analysis of the relative effectiveness of the utility and non-utility administrative approaches we adopt today.” Because of the relatively few first year projects that are currently completed and paid, this first year assessment is a process evaluation. An in-depth assessment of the program’s peak load impacts on the electric system will be performed following the 2002 program year. This initial program assessment also does not address any comparative aspects of the utility and non-utility administrative approaches. This aspect will be addressed immediately following the second year program evaluation effort.

ES.3 Work Plan Overview

In accordance with the Program Evaluation RFP and Working Group input, RER will perform the following primary tasks for this multi-year program evaluation effort:

- Task 1: Development of the Program Evaluation Plan
- Task 2: Statistical Methods Assessment and System Sampling
- Task 3: Participant Characterization
- Task 4: Compile and Summarize SelfGen and Other Incentive Program Participation
- Task 5: Determine System Operational Characteristics
- Task 6: Implement On-Site Monitoring, Data Collection, and Field Verification Inspections
- Task 7: Develop Program Recommendations to Improve On-Peak Load Impacts
- Task 8: Program Administrator Impacts and Process Assessment (Utility vs. non-Utility)
- Task 9: Annual Program Evaluation Reports
- Task 10: Other Project Deliverables

The emphasis of this first year process assessment involved the above tasks, with the exception of Tasks 5, 6, and 8, which will begin during and after the second program year.

ES.4 Program Goals, Rationale, Objectives and Evaluation Criteria

CPUC Decision 01-03-073 presented the rationale and eight goals of the program, as listed in Table ES-2. Program evaluation criteria were then developed for meeting each goal and

³ CPUC. Interim Opinion: Implementation of Public Utilities Code Section 399.15(b); Load Control and Distributed Generation Initiatives, March 27, 2001.

incorporated into the first year process evaluation work scope. These criteria were subsequently adopted in ALJ Gottstein’s April 24, 2002 Ruling of “Schedule for Evaluation Reports” and are presented in Table ES-2.

Table ES-2: Evaluation Criteria of the California Self-Generation Incentive Program

Goal/Rationale/Objective	Criteria for Meeting Goal
G1 Encourage the deployment of distributed generation in California to reduce peak electrical demand	C1.A Increased customer awareness of available distributed generation technology and incentive programs
	C1.B Fully subscribed participation in program (i.e., total installed capacity, number of participants)
	C1.C Participants’ demand for grid power during peak demand periods is reduced
G2. Give preference to new (incremental) renewable energy capacity	C2.A Development and provision of substantially greater incentive levels (both in terms of \$ per watt and maximum percentage of system cost)
	C2.B Provision of fully adequate lead-times for key program milestones (i.e., 90 day and 12 month)
G3 Ensure deployment of clean self-generation technologies having low and zero operational emissions	C3.A Maximum allocation of combined budget allocations for Level 1 and Level 2 technologies
	C3.B A high percentage of Level 1 and Level 2 projects are successfully installed with sufficient performance
G4 Use an existing network of service providers and customers to provide access to self-generation technologies quickly	C4.A Demonstration of customer delivery channels for program participation to include distributed generation service providers and existing utility commercial/industrial customers networks
G5 Provide access at subsidized costs that reflect the value to the electricity system as a whole, and not just to individual customers	C5.A Demonstrate that the combined incentive level subscription, on an overall statewide program basis (i.e., the participant mix of Levels 1, 2, and 3 across service areas), provides an inherent generation value to the electricity system (avoided generation, capacity, and T&D support benefits).
G6 Help support continued market development of the energy services industry	C6.A Quantifiable program impact on market development needs of the energy services industry
	C6.B Demonstrated consumer education and program marketing support as needed
	C6.C Tracking of energy services industry market activity and participation in the program
G7 Provide access through existing infrastructure, administered by the entities (i.e., utilities and SDREO) with direct connections to, and the trust of small consumers	C7.A Ensure that program delivery channels include communications, marketing, and administration of the program, providing outreach support to small consumers
G8 Take advantage of customers’ heightened awareness of electricity reliability and cost	C8.A Use existing consumer awareness and interact with other consumer education/marketing support related to past energy issues to market the program benefits.

ES.5 Data Collection

Data were collected from several sources to support the program status, participant characterization, and process evaluation tasks. The following key data were collected and used in the first year evaluation:

Program Administrator Tracking Data. The project team reviewed the Program Administrator tracking data and contacted each Program Administrator to resolve questions about the data. After reviewing the electronic tracking data provided by each Program Administrator, the data were standardized to create a detailed statewide tracking database.

Program Administrator Interviews. In-depth interviews were conducted in-person by senior staff with each Program Administrator and with SDG&E⁴. Before the interviews, each Program Administrator received an outline of the interview, along with a checklist of materials and data that would be required during the interview. There were three to four representatives for the Program Administrator; these representatives generally included, at the least, the Program Manager, a marketing specialist, and a database manager. The main topics covered in the interviews included, program performance, program design, supply channel and installation issues, application process, barriers to program participation, project verification and metering, and marketing and consumer education.

Host Customer In-Depth Surveys. A stratified sample design was developed for host customers who participated in the SelfGen Incentive Program in 2001.⁵ An in-depth telephone survey instrument was designed and administered to 84 host customers. The main topics covered during the interviews and surveys included program design, business characterization of the host customer, reasons for installing distributed generation, difficulty of various stages of project development, and overall satisfaction with the program.

Supply Channel In-Depth Surveys. In-depth telephone surveys and face-to-face interviews were conducted with 41 suppliers involved in the 2001 SelfGen Incentive Program. These suppliers generally fell into one of the following categories: 1) third party applicants, or 2) manufacturers. A sample allocation strategy was developed that ensured that all eligible technologies and administrator service areas were adequately represented. The major topics covered by the survey included program design, typical project development process, the effects of the SelfGen Incentive Program on this process, and the impact of the SelfGen Incentive Program on the supplier's business.

⁴ The San Diego Regional Energy Office (SDREO) is the Program Administrator for customers in the SDG&E service territory.

⁵ "Host customer" refers to the end user of the self-generation system. In about one-fourth of the cases, the host customer also served as the applicant to the program.

Nonparticipant Telephone Surveys. A stratified random sampling design was developed for the survey of nonparticipating businesses located in the electric service territories of PG&E, SDG&E, SCE, and LADWP.⁶ The nonparticipant sample of 300 completed surveys was stratified by business type and electric service territory. The target for each stratum was selected based on that stratum's proportional share of total estimated electrical consumption in 2000,⁷ and adjusted to reflect the stratum's volume of self-generation activity. The nonparticipant surveys were administered using a CATI (computer-assisted telephone interview) system. The main topic areas covered by the nonparticipant survey included awareness of distributed generation and the SelfGen Incentive Program, experience with distributed generation, and potential interest in distributed generation.

ES.6 Program Status of 2001 Participants

The 2001 SelfGen Incentive Program received 262 requests for funding (in the form of a Reservation Request Form) in 2001. These requests are referred to as the 2001 projects, and the host customers and suppliers associated with those projects as the 2001 host customers and suppliers. The application status of each of these 2001 projects changes regularly. For this report, the stage and status of these projects were developed using the latest available data (from March 2002). Further, all of the 2001 projects are categorized into two basic types: active projects or inactive projects. About 60% of the 2001 projects were still active as of March, and roughly 57% of the installed capacity of 2001 projects were still active as of March, accounting for 55,209 kW.⁸

Table ES-3 summarizes program participation and status of all active administrator applications on a statewide basis as of March 2002. As shown in the table, there were 157 active projects at that time requesting \$60.1 million in incentives, which represents a total rated generating capacity of 55.2 MW.

Table ES-4, Table ES-5, and Table ES-6 summarize the individual system size, eligible system cost, and allocated participant/program incentives contribution by technology. Since most of the incentives are based on installed cost rather than capacity, the mean proportion of cost provided by the program is very close to the maximum allowable percentage at each incentive level.

⁶ LADWP was the only municipal utility included in the survey. It was necessary to include LADWP in order for SoCalGas' service territory to be adequately represented.

⁷ The estimates of electrical consumption by business type and electric utility service area were obtained from the CEC's reports on California Energy Demand and EPRI's 1998 Energy Market Profiles (citations below). (CEC. 1995. *Staff Report. California Energy Demand. 1995-2015. Volumes III-VII.* Sacramento, CA) (EPRI. 1999. *Energy Market Profiles. Volume 3: 1998 Industrial Buildings, Equipment, and Energy Use.* MA-114434-V3. Palo Alto, CA)

⁸ Note: These figures differ slightly from those reported in the CPUC's "July-December 2001 Status Report (updated April 24, 2002)" because of the timing of the data used.

Table ES-3: Summary of Active 2001 Projects

	2001 Incentive Budget (\$ millions)	Active Projects as of March 2002 (for all Administrators)											
		Reservation Request Form Under Review			Conditional Reservation			Confirmed Reservation			Total Active		
		Projects	KW	Incentives (\$)	Projects	kW	Incentives (\$)	Projects	kW	Incentives (\$)	Projects	kW	Incentives (\$)
Incentive Level 1	54.9	5	893	3,388,039	31	5,237	20,588,110	4	906	4,038,867	40	7,036	28,015,016
Incentive Level 2	25.5	0	0	0	2	800	2,000,000	2	400	871,180	4	1,200	2,871,180
Incentive Level 3	38.5	15	3,682	2,049,316	81	35,530	22,731,044	17	7,761	4,439,539	113	46,973	29,219,899
All Incentive Levels	118.9	20	4,575	5,437,355	114	41,567	45,319,154	23	9,067	9,349,586	157	55,209	60,106,096

All 2001 applicants in the Reservation Request Form Under Review and Conditional Reservation categories should have moved on to the confirmed reservation category by now, or into an inactive category (except for those who received a milestone deadline extension).

Table ES-4: Potential Installed Capacities for Active 2001 Projects

Technology/Fuel	System Size (kW)				
	No. of Projects	Mean	Min	Median	Max
Photovoltaic	40	176	30	87	1,000
Fuel cell, Renewable Fuel	0				
Fuel cell, Non-Renewable Fuel	4	300	200	200	600
IC engine	82	512	60	400	1,000
Micro and Small Gas Turbines	31	161	28	100	1,000

Table ES-5: Eligible Cost per Watt of Active 2001 Projects

Technology/Fuel	Eligible Cost per Watt (\$/Watt)				
	No. of Projects	Mean	Min	Median	Max
Photovoltaic	37	\$8.88	\$5.04	\$8.76	\$16.27
Fuel cell, Renewable Fuel	0				
Fuel cell, Non-Renewable Fuel	4	\$6.87	\$5.74	\$6.62	\$8.50
IC engine	52	\$2.24	\$1.20	\$2.06	\$4.13
Micro and Small Gas Turbines	19	\$3.14	\$1.60	\$3.16	\$5.20

Table ES-6: Participant vs. Program Contribution for Active Projects

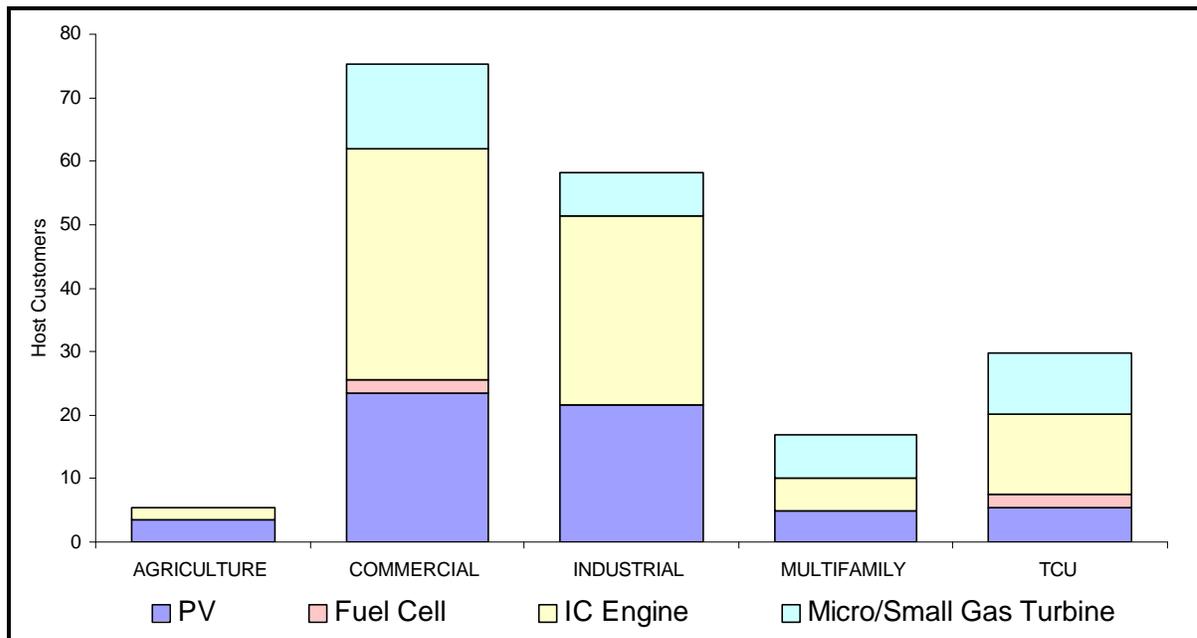
Technology	Maximum Allowable Incentive per Watt	Average of Actual Incentives (\$/Watt)	Maximum allowable Percent of Eligible Cost	Average of Actual Incentives (Percent of Eligible Cost)
Photovoltaic	\$4.50	\$4.13 (N = 40)	50%	47% (N = 37)
Fuel Cell (Non-renewable)	\$2.50	\$2.34 (N = 4)	40%	34% (N = 4)
IC engine	\$1.00	\$0.61 (N = 81)	30%	29% (N = 52)
Microturbine	\$1.00	\$0.84 (N = 31)	30%	29% (N = 19)

ES.7 Characterization of 2001 Participants

Third party applicants, distributed generation equipment manufacturers, and host customers are the most visible stakeholders in the SelfGen Incentive Program. In this report we refer to these stakeholders collectively as “the participants.”

Host Customers. At the time of this review, there were 192 unique host customers involved with the 2001 Program. Figure ES-1 presents the distribution of technologies by sector for the host customers. Internal combustions engines were most heavily represented overall. Photovoltaic and internal combustion engine systems were present in every major sector, and microturbines were present in every sector except agriculture. Fuel cells were only present in the commercial and TCU sectors.

Figure ES-1: Distributed Generation Technology by Major Sector for Host Customers



Third Party Applicants. Fifty-five different third party applicants accounted for about three-fourths of the 2001 SelfGen Incentive Program applications. These third party applicants consist primarily of ESCOs, energy consultants, and contractors. Photovoltaic and internal combustion engine projects are dominated by a small number of third party applicants.

Manufacturers. There were 40 manufacturers represented in the 2001 projects. There was a clear manufacturing leader for each eligible technology. The leading manufacturers of photovoltaic modules, fuel cells, and microturbines each had at least twice the number of projects as their closest competitors.

ES.8 Process Assessment Findings

This section presents the key findings of the first year process assessment of the SelfGen Incentive Program, organized by topical areas of the assessment.

Effectiveness of Joint Delivery Implementation Approach

There is unanimous agreement among third party applicants, existing Program Administrators, and other supply channel stakeholders that a regionally based program administrator implementation approach is more effective than an approach using a single centralized statewide program administrator. Local or regional entities with energy experience, financially independent of the distributed generation markets, and with strong ties to a broad spectrum of electric and gas customers are viewed as the strongest candidates for performing the regional administrator function. Regional administrators are also perceived to be more informed at the local level than statewide administrators and thus better able to deal with initial project development issues, project implementation, and program marketing functions.

Program Operational Efficiency Issues

In-depth interviews were held with host customers, third party applicants, and the four Program Administrators on key issues relating to the program's delivery and operational efficiency. Highlights of findings from these interviews are presented below.

Familiarity with and clarity of the applicant materials and instructions. Three-fourths of the interviewed customers found the program application forms and instructions to be clear. In order to improve this aspect of the program, interviewed applicants and Program Administrators recommended the following actions to improve the effectiveness of the application process:

- Create a checklist of requirements for each stage of the application process,
- Simplify application materials, and
- Simplify application instructions

Responsiveness of Program Administrators to applicants' questions. The overwhelming reaction from program host customers is that the Program Administrators were both responsive and provided satisfactory answers to program-related questions. Most of the reported delays in the application process were simply the result of the Program Administrator's enforcement of the various program requirements, most notably the difficulty in submitting and/or obtaining the interconnection agreement from the electric utility. This issue was clearly most prevalent with the Early Stage host customers and with

projects involving microturbines and photovoltaic systems. Advanced Stage host customers, indicated that the delays were exclusively the result of either third party ESCO applicants or service/equipment vendors, and not the Program Administrators.

Adequacy of the SelfGen Incentive Program application 90-day and one-year requirements. The two major project development milestones that applicants must achieve to receive their allocated incentive funds according to Program Handbook requirements are 1) Proof of Project Advancement (PPA), or *the 90-day PPA requirements*, and 2) the one-year project completion requirements. Most of the interviewed 2001 applicants had at least begun to address the 90-day PPA requirement, while none of these applicants had, at the time of the interview, reportedly concluded the one-year project completion requirement.

Just over half of the Early Stage respondents indicated that the 90-day PPA requirement did not provide them sufficient time for their project. Host customers with photovoltaic systems, fuel cells, and internal combustion engines reported the most difficulty with this program requirement. Third party responses were markedly different, with less than one-fourth of this respondent group indicating that the 90-day PPA requirement was not sufficient. Third parties reported microturbine projects as the having the greatest difficulty in meeting the PPA requirements. With host customers, the most significant reported problems with meeting the 90-day PPA were being able to receive internal approvals thus committing the project funds and ordering the generating equipment. Third parties reported the most difficulty with submission of the electrical interconnection application, distantly followed by submittal of air pollution permits, ordering the generating equipment, and providing project cost detail.

Although there is clearly much less direct experience with program applicants meeting the one-year project completion deadline requirements, three-fourths of the interviewed host customers and over 80% of interviewed third parties reported that this program requirement provides sufficient time to meet their current project schedules. Host customers with fuel cell projects and third parties with photovoltaic systems reported the most concern with the one-year completion deadline. Adequate time for equipment manufacture/shipping and obtaining financing were mentioned most often by third parties. Host customers, on the other hand, mentioned internal decision making and obtaining approvals most often – as was the case with the 90-day PPA requirement.

Program Acceptance and Satisfaction

Program acceptance and satisfaction is reported as high by host customers and only relatively slightly lower by third party respondents. Given that the third party respondents often play the dual role of program applicant and project development prime contractor, their

expectations of program support functions are likely to be greater than those of host customer applicants.

Program Awareness

A nonparticipant sample of customers were surveyed to determine awareness levels of distributed generation opportunities, the CEC's Buydown Program, and the SelfGen Incentive Program. Sixty percent of the nonparticipant respondents said that they were aware they could generate their own power at their site. When asked to specify their awareness of self-generation incentive programs, 9% indicated that they were aware of the CEC's Emerging Buydown Program and 12% indicated that they were aware of the SelfGen Incentive Program.⁹

Surveyed nonparticipants are more apt to learn about the SelfGen Incentive Program from a utility representative or through a program flyer in their electric bill (e.g., via IOU Program Administrators' marketing activities). Participating host customers appear to learn about the SelfGen Incentive Program via a third party distributor or directly from a utility representative, rather than through Program Administrators' marketing activities.

Administrator Marketing Efforts

The degree of marketing in the first year of the program varied considerably across the four Program Administrators. The total administrative dollars allocated to marketing has ranged from 0.13% to 7.5% of Program Administrator's reported 2001 expenditures. Some administrators appear to have placed a greater emphasis on marketing the Program than others. The Program Administrators use a number of marketing mediums in their efforts to fully subscribe the program, including workshops, web site marketing, telemarketing, targeted marketing, press releases, marketing plans, industry report, account executive incentive, direct mail, collateral materials, and print and radio advertising.

Effectiveness of Program Design upon Removing Market Barriers

There are a number of barriers limiting the market for distributed generation and participation in the SelfGen Incentive Program. The most common of these include the following competition for available capital, regulatory uncertainty (standby rates, exit fees, net metering, etc.), lack of available information, lack of informed awareness, electricity and natural gas is a small business cost component, lack of consumer interest, implementation

⁹ Although the CEC program has been in existence two and a half years longer, the higher awareness could be explained by the target group for this survey of nonparticipants. In particular the target group was oriented towards commercial/industrial customers that are not the focus of the current Emerging Buydown Program, which currently has available funding for photovoltaic and small wind systems less than 10 kW.

difficulty, inadequate lead-times to achieve milestones, and concern about business disruption.

The SelfGen Incentive Program is designed to address a number of these market barriers through its program design and associated Program Administrator marketing efforts. It cannot effectively address barriers such as relatively small electricity costs, potential business disruptions, or future regulatory uncertainty. The assurance of an upfront incentive will 1) reduce the need for project equity and/or debt and increase the likelihood that capital can be obtained, and 2) affect consumer interest in distributed generation technology on both the demand side and through available supply channels. In some instances, the program's incentives are critical to the economic viability of the self-generation installations. The program is generally regarded as effective in promoting self-generation technologies and creating an incentive for hosts to consider these systems.

In an effort to reduce market barriers, Program Administrators have developed supplemental information to increase awareness of the program and distributed generation technology, including how to 1) meet the useful waste heat recovery requirements, and 2) streamline the application process. Implementing additional targeted marketing activities by the Program Administrators, such as holding program and regulatory/rate information workshops and account executive meetings with target customers, will further positively affect the impact on many of these market barriers to distributed generation.

Effectiveness of Program Design Upon Leveraging Market Incentives

The current approach of using an upfront cash incentive is focused on addressing high capital costs and lack of consumer interest in the self-generation option. The program's three-tiered incentive level structure is designed to encourage the deployment of low or zero emissions technologies. The program guidelines do not allow other state-level distributed generation program incentives funds, such as the CEC's Buydown Program, to be added to the SelfGen Incentive Program amount for any applicant funded through the program. This requirement can ensure that projects continue to require a substantial investment by the customer or system owner.

However, in the case of local, federal, or other private sources of market incentives, these funds are simply deducted from the eligible system costs in determining the program incentive. This interactive incentive approach with non state-funded programs increases the total potential funding received by eligible projects, which may have a positive deployment impact on distributed generation technologies with higher capital costs or perceived technical risks (e.g., fuel cells, photovoltaics, and small wind turbines). If such incentive funding is available for the lower capital cost (i.e., Level 3) distributed generation technologies, they

will typically not require these added incentives from other programs in order to be considered economic by project developers/owners.

Although there was no reported free ridership with the Level 1 incentive applicants, it is clear that medium- and large-scale photovoltaic eligible project costs have increased over the past several years since the CEC Emerging Buydown incentives were increased from \$3.00 to \$4.50 per watt. Given the rapidly expanding market and availability of State tax credits to many system purchasers, the increase in installed costs in these larger systems may well be a direct result of the increase in available program and other incentives. Reducing the Level 1 incentives for PV slightly (without reallocating Level 1 Program Incentives budgets) will have the impact of further leveraging the Program funding for Level 1 renewable technologies and over time potentially reducing installed system costs. Further analysis of this potential action should be addressed jointly by the CPUC and the CEC. In addition Level 2 incentives for nonrenewable fueled Fuel Cells (and Level 1 – Fuel Cells) appear to be too low to impact the market; although it is not at all clear whether consumer perception of other *technology risk factors* simply outweigh the benefit of the current incentive levels. If this technology commercialization is the key issue, then increasing the program incentives for fuel cells will have little effect on Incentive Level 2 program participation.

ES.9 Administrator Coordination of Participation in Other Incentive Programs

Information related to participation in other distributed generation incentive programs is available from several mostly independent sources. These have included SelfGen Incentive Program application forms, host customer interviews, and supplier interviews; tracking databases for other programs; and other miscellaneous sources.

After reviewing the available information sources on other programs, it appears that the statewide compliance database is being used effectively to identify SelfGen Incentive Program projects that are also supported by the CEC's Emerging Buydown Program, or that might be involved with the SelfGen Incentive Program through multiple administrators. Review of participation data for other incentive programs suggests that SelfGen Incentive Program participants typically are satisfying the program requirement to disclose involvement with other programs affecting end-user first costs.

ES.10 Recommendations

This first year process assessment presents two types of recommendations for the Program. These include recommendations regarding program design issues and process-related recommendations for Program Administrators to consider and implement in their Statewide Working Group planning and coordination efforts.

Program Design Recommendations

Given the level of application activity in the first year of the program, the basic structure of the incentives design appears to be valid and producing desired results. The relatively high level of applicant turnover (i.e., rejected, withdrawn, and suspended applications) in the first seven months of the program however may indicate a need for some fine tuning in the program design and/or applicant filing and implementation processes.¹⁰ Several potential recommendations to improve the design of the SelfGen Incentive Program were revealed during the first-year evaluation. The SelfGen Incentive Program offers a one-time cash incentive in an effort to reduce peak demand on the electric grid. The current approach is focused on addressing high capital costs and lack of consumer interest in the self-generation option. In addition, the three-tiered incentive level structure is designed to encourage the deployment of low or zero emissions generation technologies. The program guidelines do not allow other state-level distributed generation program incentives funds, such as the CEC's Buydown Program, to be added to the SelfGen Incentive Program amount for any applicant funded through the program. This requirement can help ensure that the limited available Program incentives are distributed to the greatest amount of new generation capacity and that projects continue to require a substantial investment by the customer or system owner.

However, in the case of local, federal, or other private sources of market incentives, these funds are simply deducted from the eligible system costs in determining the program incentive. This interactive incentive approach with non state-funded programs increases the total potential funding received by eligible projects, which may have a positive deployment impact on distributed generation technologies with higher capital costs or perceived technical risks (e.g., fuel cells, photovoltaics, and small wind turbines). If such incentive funding is available for the lower capital cost (i.e., Level 3) distributed generation technologies, they will typically not require these added incentives from other programs to be considered economic by project developers/owners. Therefore, it is recommended that the treatment of *non-state other program incentives* for all Level 3 technologies be modified to be identical to other state-funded programs (i.e., Other local/Federal/Private Program incentives are directly

¹⁰ Note that nearly three-fourths of the first-year applications were submitted by Third Parties; leaving about one-fourth of the applications submitted by the host customer. This suggests that a modified application submittal requirements may be needed to reduce the turnover – depending upon the level of application turnover that occurs during the early- and mid-program year 2002.

deducted from the calculated Self-Gen Incentive). Implementing this revision would however, complicate, and not simplify the program application materials, thus providing further potential confusion by host customers and third party applicants.

Given the self-reported level of Incentive Level 3 free ridership¹¹ by third parties and that the vast majority Level 3 incentives were based on eligible system cost,¹² the issue of whether the Level 3 incentive (\$/watt and % of eligible cost) should be reduced needs to be addressed through further study. This assessment should be based upon reported implementation costs, self-reported project developer investment hurdle rates and by tracking the success of these first year projects through the second program year. As the self-generation market increases in size over time, this action will have an impact on the total leveraging of the Program's available funds.

Likewise, although there was no reported free ridership with the Level 1 incentive applicants, it is clear that medium and large scale photovoltaic eligible project costs have increased over the past several years since the CEC Emerging Buydown incentives were raised from \$3.00 to \$4.50 per watt. Given the lack of other reported drivers and a rapidly expanding market, this noted increase in installed costs in the larger photovoltaic systems may well be a direct result of the increase in available program incentives. Reducing the Level 1 incentives slightly may have the longer term impact of further leveraging the program funding for Level 1 renewable technologies. In addition, Level 2 (and Level 1 – fuel cells) incentives appear to be too low to impact the market, although it is not clear whether consumer perception of other *technology risk factors* simply outweigh the benefit of the current incentive levels. If this technology commercialization/consumer perception is the key issue, then increasing the program incentives for fuel cells will have little effect on Incentive Level 2 program participation. Further analysis is required by the CPUC Energy Division to determine the optimum incentives for the Program, given its stated goals and objectives.

Process Recommendations for the Program Administrator Working Group

Most participants and third parties indicated that the Program Administrators were doing an excellent job in reviewing and processing their applications to date. However, a number of process-related improvements were either directly suggested or inferred through stakeholder input and deserve further consideration in future program planning and implementation improvement efforts. These process-related recommendations are grouped into three major

¹¹ A free rider is defined as a project participant that would have implemented the same project in the absence of the program's incentives.

¹² According to the Administrator's statewide 2001 Program Data, 94% of the active internal combustion engine applicants and 87% of the active microturbine applicants incentives are based upon eligible system cost.

categories: 1) Program Administrator Tracking Database, 2) Implementation Efficiency, and 3) Program Marketing.

Administrator Program Tracking Database Recommendations

Each Program Administrator has devoted considerable resources to their project tracking systems. Each tracking system was designed to aid in the administration of the program, and they all serve that purpose very well. Unlike the Program Administrators, however, outside evaluators do not have direct day-to-day knowledge of each project. The only project-level details available to those parties are in the Program Administrator tracking data.

To efficiently track participants on a *statewide* basis, and to consistently characterize *all* projects and participants, it is proposed that the Program Administrators address the following:

- Standardize the variables used to report the status and stage of a project,
- Include additional variables in the Program Administrator tracking data, and
- Provide RER with quarterly updates of the Program Administrator tracking data.

The host customer participants suggested three notable improvements to the overall application process. These improvements include the following:

- Creation of a standardized checklist of program requirements for each stage of the application process,
- Simplify application materials, and
- Simplify (e.g., easier to understand) application instructions.

Although this may be existing policy for some Program Administrators, it was suggested by participants that one person in each Program Administrator’s office be *assigned to each applicant* as their “customer service representative” to facilitate addressing all application process questions and required clarifications.

Although the majority of Early Stage respondents felt that the initial 90-day proof of project advancement did not provide sufficient time to meet the Program’s requirements, we do not recommend that this milestone be extended at this time. Rather RER recommends that more direction and guidance be provided to these potential applicants - *before they apply to the program*. This objective could be achieved through 1) Program Administrator’s marketing materials, 2) the above recommended standardized checklist of program requirements, or 3) through a revised set of criteria that would consider a submitted application “fully complete” (i.e., by adding one or more of the requirements for proof of project advancement to the initial application acceptance process, such as the submittal of the air permit application and/or the electric interconnection agreement).

Program Marketing Recommendations

Several recommendations will help to improve program awareness and increase the number of informed qualified applicants. These awareness and marketing related recommendations are summarized below:

- Increase utility account executive/representative involvement with the SelfGen Incentive Program.
- Improve internal communication and awareness of the Program within the affected utility operating departments.
- Continue to educate third party suppliers via workshops on SelfGen Incentive Program.
- Increase global marketing via direct mail and advertising to increase nonparticipant awareness of the SelfGen Incentive Program.
- Strengthen marketing messages so that nonparticipants hearing about program will be more apt to take some action leading to a program application.

The bottom line is that the Program Administrators need to implement marketing activities that will 1) have an effect on the number of successful applications, and 2) implement process changes that will ease the overall application and project implementation process.

Future Evaluation Needs

The evaluation of the SelfGen Incentives Program is discussed within Section 2 (Work Plan) of this report. The next major task in this program evaluation will involve the installation of monitoring equipment (where not previously installed by program applicants for performance measurement/contract billing purposes) and the collection and analysis of this data on a regular basis from those 2001 projects that are now operational. At the end of the 2002 Program Year, RER will initiate the peak-load impacts and second year process assessment of the Program. In addition, during the second quarter of 2003, the Program Administrator Comparative Assessment Report will be developed and submitted to the CPUC.

1

Introduction

Assembly Bill 970 was signed into law September 6, 2000 and required the California Public Utilities Commission (CPUC) to initiate certain load control and distributed generation program activities. This included a provision for making available financial incentives to eligible customers. The Self-Generation Incentive Program (SelfGen Incentive Program) was adopted on March 27, 2001 by the CPUC under Decision 01-03-073. Since June 29, 2001, the program has been available to provide financial incentives for the installation of new qualifying electric generation equipment that will meet all or a portion of the electric needs of an eligible customer's facility. Under the direction of the CPUC Decision, the SelfGen Incentive Program is administered on a regional joint-delivery basis through three investor-owned utilities (Southern California Edison, Pacific Gas & Electric, Southern California Gas Company) and one non-utility administrator entity, the San Diego Regional Energy Office (SDREO).¹

The SelfGen Incentive Program is designed to complement the California Energy Commission's existing Emerging Renewables Buydown Program. This is accomplished primarily by focusing on the commercial/industrial/agricultural market sectors and through the inclusion of select nonrenewable fueled self-generation technology – up to 1,000 kW in generating capacity.² Coordination with the CEC Buydown Program occurs through participation in the Statewide SelfGen Incentive Program Working Group and through a separately managed statewide self-generation program compliance database.

The purpose of this report is to document the SelfGen Incentive Program's first-year process evaluation procedures, results and recommendations.

¹ SDREO is the Program Administrator for San Diego Gas & Electric customers.

² A subsequent CPUC Ruling increased the allowed maximum system size to 1.500 kW – although the maximum incentives basis remains capped at 1,000 kW.

1.1 Program Description

The SelfGen Incentive Program is offered throughout most of the state of California, specifically within the service areas of Southern California Edison, Pacific Gas & Electric, Southern California Gas Company, and San Diego Gas & Electric. The Program will continue to accept applications through December 31, 2004, subject to availability of Administrator Program Funds. Decision 01-03-073 authorized an annual statewide allocation of \$125 million, including all program administration costs.

“Self-generation” refers to distributed generation technologies (microturbines, small gas turbines, wind turbines, photovoltaics, fuel cells and internal combustion engines) installed on the customer’s side of the utility meter that provide electricity for a portion or all of that customer’s electric load. Under the program, financial incentives will be provided to the targeted distributed generation technologies as summarized in Table 1-1.

Table 1-1: Summary of SelfGen Program Incentive Levels

Incentive Category	Maximum Incentive Offered (\$/watt)	Maximum Incentive as a % of Eligible Project Cost	Minimum System Size (kW)	Maximum System Size Incentivized (kW)	Eligible Generation Technologies
Level 1	\$4.50	50%	30	1,000	<ul style="list-style-type: none"> ■ Photovoltaics ■ Fuel Cells¹ ■ Wind Turbines
Level 2	\$2.50	40%	None	1,000	<ul style="list-style-type: none"> ■ Fuel Cells²
Level 3	\$1.00	30%	None	1,000	<ul style="list-style-type: none"> ■ Microturbines³ ■ Internal combustion engines and small gas turbines⁴

- 1 Operating on renewable fuel.
- 2 Operating on non-renewable fuel.
- 3 Using sufficient waste heat recovery and meeting reliability criteria.
- 4 Both utilizing sufficient waste heat recovery and meeting reliability criteria.

PG&E, SCE, and SoCalGas will administer programs in their service territories. Within the SDG&E service territory, the program is administered (via contractual arrangement) through the San Diego Regional Energy Office (SDREO).

Initially, the \$100 million statewide annual incentive budget is allocated equally amongst program Incentive Levels 1, 2, and 3. As needed, the incentive budgets may be reallocated according to need, with the exception that any Level 1 renewable allocations may not be

transferred to Level 2 or 3 nonrenewable technologies without the approval of the CPUC via an advice letter filing.

1.2 First-Year Evaluation Objectives

This first year evaluation of the SelfGen Incentive Program is performed to fulfill specific requirements identified in CPUC Decision 01-03-073 (Interim Opinion: Implementation of Public Utilities Code Section 399.15(b); Load Control and Distributed Generation Initiatives, March 27, 2001). The focus of this first year assessment has been on process evaluation addressing a number of topics, including program awareness, Program Administrator marketing, ease of application implementation and efficiency, and to the degree they can be addressed given available data, related program design issues. To summarize the activity in this initial process assessment, Decision 01-03-073 presented the rationale and goals of the program as previously summarized in Table ES-2. Evaluation criteria were then developed for meeting each goal and incorporated into the process evaluation work scope. As discussed in the work plan within Section 2 of this report, an in-depth assessment of the program to improve peak load impacts on the electric system and process improvements in the future will be performed following the 2002 program year.

1.3 Report Organization

An Executive Summary, which provides a high-level overview of the key aspects and findings of this first-year evaluation report, is presented prior to Section 1 of this report. The remainder of the report is organized into ten sections, and Appendices A through F, as described below.

- Section 2 presents the Program evaluation work plan, which by design addresses the first two operational years of the SelfGen Incentive Program.
- Section 3 describes the data collection activities to support the first year evaluation efforts.
- Section 4 summarizes the Program Status of 2001 participants as of March 2002, and provides the characteristics of these first year participants.
- Section 5 discusses the first year process evaluation analysis results.
- Section 6 discusses participation in Other Incentive Programs.
- Section 7 summarizes the Program Administrator field verification and inspection activity.
- Sections 8 and 9 preview future system monitoring data collection and operational characterization efforts to be performed in the second-year peak load impacts assessment.

- Section 10 presents the conclusions and recommendations resulting from this first-year program assessment.
- Appendix A provides the program administrator interview guide.
- Appendix B presents the host customer interview guides.
- Appendix C contains the supply channel interview guide.
- Appendix D presents the nonparticipant telephone survey instrument.
- Appendix E provides participant characterization summarized cross tabulations.
- Appendix F contains process assessment summarized cross tabulations.
- Appendix G contains a listing of other distributed generation incentive programs.
- Appendix H contains a listing of Program Administrator marketing materials.

2

Program Evaluation Work Plan

This refined scope of work provides the necessary documentation to address the revisions in work scope tasks, required deliverables, schedule, and budget for the evaluation of the first and second years of the California Public Utilities Commission (CPUC) Self-Generation Incentive Program (SelfGen Incentive Program).

There are four primary goals for the independent evaluator to accomplish under this program support effort. The first goal is to develop a measurement and evaluation plan for the SelfGen Incentive Program. This revised work plan completes the documentation of this task area for the first two years of the program's operation. The second major goal includes developing and implementing a functional statewide performance data collection and reporting framework. The third goal includes performing process and impact analyses and reporting program results, while the fourth goal involves developing recommendations regarding potential improvements to the design of the SelfGen Incentive Program. Based on this refined work scope, RER will perform ten primary tasks as contained within the original evaluation contract for this overall program evaluation effort.

- Task 1: Development of the Program Evaluation Plan
- Task 2: Statistical Methods Assessment and System Sampling
- Task 3: Participant Characterization
- Task 4: Compile and Summarize CPUC and Other Program Participation
- Task 5: Determine System Operational Characteristics
- Task 6: Implement On-Site Monitoring, Data Collection, and Field Verification Inspections
- Task 7: Develop Program Recommendations to Improve On-Peak Load Impacts
- Task 8: Program Administrator Impact and Process Assessment (Utility vs. non-Utility)
- Task 9: Annual Program Evaluation Reports
- Task 10: Other Project Deliverables

2.1 Develop and Refine Self-Generation Program Evaluation Plan (Task 1)

Under this task, RER and the statewide Program Administrators will review the proposed evaluation plan, discuss program and project implementation status, and then finalize the evaluation plan based on these discussions and the recommendations resulting from this review. The evaluation plan refined scope of work outlines in detail how the primary goals and objectives of this program evaluation effort will be accomplished in a timeframe consistent with the April 24, 2002 ALJ (M. Gottstein) Ruling.

The proposed evaluation of the SelfGen Incentive Program includes both qualitative and quantitative components. The initial first year evaluation effort focuses on 1) process issues and recommendations for improvements in program design and implementation procedures, and 2) the SelfGen Incentive Program's data collection/monitoring/field verification requirements.

During the evaluation of the second program operational year, a number of impact issues will be assessed including 1) the net impacts on customer peak load reductions for each utility service area, 2) annual energy contributions, and 3) system availability and reliability performance characteristics. Using collected program- and project-specific operational data, a qualitative and quantitative assessment will be performed for the second year evaluation. RER will perform second year process and impact assessments of the SelfGen Incentive Program, including an evaluation of cost-effectiveness from all recommended perspectives: participant, Program Administrator, and societal, as required by the final CPUC cost-effectiveness methodology for all demand reduction measures (and self-generation applications).

Developing the program evaluation criteria and plan will include four subtasks:

- Refinement of evaluation proximate indicators,
- Refinement of evaluation impact indicators,
- Development of cost-effectiveness measures, and
- Development of draft and final evaluation criteria and plan.

These subtasks are described in detail below.

Refinement of Evaluation Proximate Indicators

The following parameters represent the selected proximate indicators of program activity that will be considered in the SelfGen Incentive Program evaluation.

- Total approved reserved incentive funds and actual expenditures of incentive funds under the SelfGen Incentive Program, across the Incentive Level 1, 2, and 3 targeted technologies of distributed generation systems less than 1,500 kW (and greater than 30 kW, for Level 1 systems).
- Number and average rated capacity of projects applying for and receiving incentive payments under the program as a function of eligible technology and funding level across utility service areas.
- Number of manufacturers, system integrators, retailers, and installers for each technology/funding level actively supporting the self-generation market in California.
- Development progress and/or operational status of approved/reserved and funded projects over time (i.e., advancements of projects in the development process).

Refinement of Evaluation Impact Indicators

The following indicators will be included in the second year and subsequent impact evaluation of the SelfGen Incentive Program:

- Impacts on customer facility peak demand of self-generation facilities (when participant customer load data can be provided),¹
- Annualized impacts on net customer energy consumption from self-generation production (kWh/yr),
- Aggregate annualized impacts of net metering requirements upon participants (\$/yr benefits) and the local electric utility (\$/yr impact), where participant whole facility consumption interval data are available,
- Estimated effects on *market shares* of new renewable and nonrenewable self-generation technologies (where market shares can be defined in terms of rated capacity or annual energy sales), and
- Program effects on self-generation technology capital and, if applicable, annual operating costs.

The longer run impact of the program on individual self-generation technology market share and installed costs will depend on several key factors:

- Current and projected future status of each eligible technology in the absence of the SelfGen Incentive Program,
- The impacts of capital cost reduction incentives on the *effective* participant energy costs,

¹ Evaluators can still assess this indicator without customer whole-facility interval data. In most cases, TOU demand/consumption data will suffice.

- The increase in market penetration, sales volumes, and equipment production levels induced by the reductions in installed self-generation technology costs and the resulting increased awareness of technology benefits, and
- The sensitivity of capital and operating/maintenance costs to expansions in production levels.

Data used in evaluation analyses will include those required for program application purposes, data collected during on-site verifications, and additional data collected expressly for evaluation purposes. While medium- to long-term interval metered data serve as the bedrock of the analysis, they will be augmented with other data to maximize the effectiveness of the overall evaluation effort. Other data sources will include customer and supplier characteristics, as well as performance spot measurements, operator logs, trend data collected and stored by control systems, or weather data collected by third parties.

Even where 15-minute interval data are available for a project, engineering and program evaluation judgment will likely be required to ensure proper analytic methods are used. For instance, if data are available for less than a year (as will be the case for projects completed in the first program year) engineering judgment, input from the customer, and statistical methods may be required to extrapolate (i.e., annualize) performance across an entire year.

Development of Cost-Effectiveness Measures²

Program cost-effectiveness measures will be constructed using two types of information: estimates of gross and net program impacts and data on program and customer expenditures. These measures of performance will be developed for the net program impacts for the entire SelfGen Incentive Program and for each eligible technology, funding level, and applicable facility size category and SelfGen Incentive Program funding level.

Development of Draft and Final Evaluation Criteria and Plan

Based on discussions with and recommendations from the Program Administrators and the SCE Evaluation Manager, RER has developed and refined these working documents, known as the Program Evaluation Criteria and Work Plan.

The Program Evaluation Criteria and Work Plan were approved as stated below by CPUC Administrative Law Judge Gottstein on April 24, 2002.

² This task will be revised to include the Energy Division Demand Reduction Program Cost Effectiveness Methodology, when available.

Self-Generation Program Evaluation Criteria

The SelfGen Incentive Program was developed to fulfill the requirements laid out in CPUC Decision #01-03-073 in Attachment 1 (Adopted Programs to Fulfill AB970 Load Control and Distributed Generation Requirements, March 27, 2001).

The CPUC decision laid out the program’s objectives, as listed in the “Goals” column in Table 2-1. With input from the SelfGen Incentive Program Working Group, RER developed the criteria for assessing achievement of each goal. These criteria are listed in the “Criteria for Meeting Goal” column in Table 2-1.

Table 2-1: Evaluation Criteria of the SelfGen Incentive Program

Goal/Rationale/Objective	Criteria for Meeting Goal
G1 Encourage the deployment of distributed generation in California to reduce peak electrical demand	C1.A Increased customer awareness of available distributed generation technology and incentive programs
	C1.B Fully subscribed participation in program (i.e., total installed capacity, number of participants)
	C1.C Participants’ demand for grid power during peak demand periods is reduced
G2. Give preference to new (incremental) renewable energy capacity	C2.A Development and provision of substantially greater incentive levels (both in terms of \$ per watt and maximum percentage of system cost)
	C2.B Provision of fully adequate lead-times for key program milestones (i.e., 90 day and 12 month)
G3 Ensure deployment of clean self-generation technologies having low and zero operational emissions	C3.A Maximum allocation of combined budget allocations for Level 1 and Level 2 technologies
	C3.B A high percentage of Level 1 and Level 2 projects are successfully installed with sufficient performance
G4 Use an existing network of service providers and customers to provide access to self-generation technologies quickly	C4.A Demonstration of customer delivery channels for program participation to include distributed generation service providers and existing utility commercial/industrial customers networks
G5 Provide access at subsidized costs that reflect the value to the electricity system as a whole, and not just to individual customers	C5.A Demonstrate that the combined incentive level subscription, on an overall statewide program basis (i.e., the participant mix of Levels 1, 2, and 3 across service areas), provides an inherent generation value to the electricity system (avoided generation, capacity, and T&D support benefits).
G6 Help support continued market development of the energy services industry	C6.A Quantifiable program impact on market development needs of the energy services industry
	C6.B Demonstrated consumer education and program marketing support as needed
	C6.C Tracking of energy services industry market activity and participation in the program
G7 Provide access through existing infrastructure, administered by the entities (i.e., utilities and SDREO) with direct connections to, and the trust of small consumers	C7.A Ensure that program delivery channels include communications, marketing, and administration of the program, providing outreach support to small consumers
G8 Take advantage of customers’ heightened awareness of electricity reliability and cost	C8.A Use existing consumer awareness and interact with other consumer education/marketing support related to past energy issues to market the program benefits.

2.2 Task 2: Statistical Methods and Implementation of System Sampling Procedures

Several key issues concerning the trade-offs between data quantity, analytic methods, and accuracy/precision of impact estimates were addressed in the discussion under Task 1. A related issue concerns the feasibility of employing a sampling strategy for both program surveys and for the metering and collection of completed project applicant’s electrical output

information. The investor-owned electric utilities will be either metering and/or collecting electrical interval output information on *every* generation system installed under the program, until and unless the Program Administrators implement a statistical sampling method.³ Task 2 of RER’s scope of work encompasses two subtasks for each annual (or phase of) program assessment:

- 1) Determining whether, and how, a statistical method could be used to decide how many and which types of nonparticipants, participants, and systems will be surveyed and/or metered for process and impact assessment related operational and performance characteristics, and assessing what the accuracy/precision implications of the selected method would entail, and
- 2) If a statistical sampling method is deemed appropriate for either surveys and/or metering, developing the selected sampling methodology for each phase of the program evaluation.

Within this task, RER will develop recommended sampling procedures with estimated implementation costs based on the expected number of participants by incentive level and technology, the expected timing of the participant project on-line dates, the selected statistical confidence level and sampling error, and alternate sub-sample groupings. Standard sampling practices will be employed, including finite population corrections in the likely event that population sizes are small for some of the technologies. This effort will likely be repeated at least twice based on the most recent program participation status information.

Program Surveys – Sample Design Implementation

To achieve the desired precision in the program evaluation surveys, it is necessary to determine if a full census or sampling approach is needed for each survey. For most program participant stratifications, RER expects to implement a census approach for the surveys performed in the first year of the program. The exception to this case in the first year of the program includes Incentive Level 3 Early Stage participants with internal combustion engines and the supply channel stakeholders, both of which will be sampled according to the strategy outlined below. In addition, nonparticipants that are considered representative of the participant group will be developed through a similar design process. Table 2-2 and Table 2-3 summarize the sample design associated with each of these two non-census surveys during the first year evaluation. The supply channel sample frame summarized in Table 2-2 indicates the total population and sample target for each technology according to the total number of 2001 applications submitted by the Third Party. In Table 2-3, the target sample

³ Electric utilities may not need to meter the net generation output of all incentivized systems – in the case where either host customers or third parties have installed accurate and verifiable metering systems funded in part by the Program. Administrator’s field personnel should however verify the accuracy of such installed metering systems during the on-site verification visit prior to completion of the payment process.

frame is identified by sector and electric utility service area, with further delineation by industry type. Los Angeles Department of Water and Power (LADWP) electric customers are included along with SCE customers in the sample to ensure that most eligible SoCalGas customers are addressed in the overall sample frame without major gaps or overlap with the existing SCE sample.

Table 2-2: First-Year Supply Channel Survey Sample Design

Table 1: All 2001 Third-Party Applicants										
	PV		Fuel Cell		Microturbine		IC engine		All technologies	
# of 2001 applications	population	target	population	target	population	target	population	target	population	target
>8	2	2	0	0	0	0	1	1	3	3
2 to 8	9	5	1	1	2	2	16	7	28	15
only 1	6	2	1	1	8	3	9	4	24	10
<i>total</i>	<i>17</i>	<i>9</i>	<i>2</i>	<i>2</i>	<i>10</i>	<i>5</i>	<i>26</i>	<i>12</i>	<i>55</i>	<i>28</i>
<i>NOTE: of these 28 targeted surveys, approximately 6 will be with firms that are also manufacturers (there are 10 such firms out of the population of 55)</i>										

Table 3: 2001 Mfgs represented in SELFGEN (Note: some of the mfgs are also 3rd party applicants)										
	PV		Fuel Cell		Microturbine		IC engine		All technologies	
# of 2001 applications	population	target	population	target	population	target	population	target	population	target
>19	1	1	0	0	1	1	2	2	4	4
10 to 19	3	2	0	0	0	0	3	2	6	4
2 to 9	4	1	1	1	3	1	7	1	15	4
1 only	4	1	2	1	4	1	5	1	15	4
<i>total</i>	<i>12</i>	<i>5</i>	<i>3</i>	<i>2</i>	<i>8</i>	<i>3</i>	<i>17</i>	<i>6</i>	<i>40</i>	<i>16</i>
<i>NOTE 1: of these 16 targeted surveys, approximately 12 will be with firms that do NOT serve as Third Party Applicants in the SELFGEN program</i>										

Table 2-3: First Year Nonparticipant Survey Sample Design

	LADWP	SDG&E	PG&E	SCE	All
Commercial	17	38	55	67	177
Industrial	8	9	32	33	82
Agriculture	1	1	6	6	14
TCU ⁴	3	6	9	9	27
All	29	54	102	115	300
	10%	18%	34%	38%	100%
Commercial					
Office	2	4	7	8	21
Restaurant	1	1	2	3	7
Retail	1	2	3	4	10
Food Stores (food/liquor)	2	3	8	7	20
Warehouse (refrigerated/un-refrig)	2	2	7	6	17
Schools	2	5	7	10	24
Colleges	2	6	6	8	22
Hospitals (health care)	2	4	7	6	19
Lodging (hotels)	2	9	5	11	27
Misc	1	2	3	4	10
Total	17	38	55	67	177
Industrial					
Manufacturing	6	5	27	28	66
Construction	1	2	2	3	8
Mining & Extraction	1	2	3	2	8
Total	8	9	32	33	82
Agriculture					
Agriculture and pumping	1	1	6	6	14
Total	1	1	6	6	14
TCU					
Wastewater treatment ⁵	2	3	5	4	14
Other TCU	1	3	4	5	13
Total	3	6	9	9	27

⁴ TCU is transportation, communications, and utilities.

⁵ Wastewater treatment facilities were given their own category because there was a relatively large number in the SelfGen Incentive Program.

Program Monitoring and Verification Sample Design Implementation

If it is determined that a statistical sample will be drawn (instead of a full census) for program electric generation and useful thermal energy production monitoring purposes, the sampling methodology will be developed and submitted to the SCE Evaluation Manager and the statewide team of Program Administrators for their review and approval. Statistically valid samples will then be drawn for the number of systems on-line at that time. As new systems are approved for the program during subsequent Program Years 2002 through 2004, additional monitoring sites will be selected as necessary to maintain prescribed evaluation accuracy/precision levels.

Many of these systems will likely not be operational within the timeframe for the first operational program year report. It is expected that the required electrical energy interval output information will be supplied to the evaluation team by each participating utility by the middle of the second program year (i.e., 2002).

Collecting electrical energy output data from a full census of completed participants or a statistical sample of participants will likely depend on the final number of participant segments desired and the expected number of completed participants per segment achieved at the time of initial data collection for each specific program assessment period. Sampling in both the survey and electric metering processes can result in potential cost advantages if the sampling segments have relatively large populations. A large number of participant segments (i.e., segmenting system sizes or utility service area) will reduce cell population sizes and increase the ratio of needed survey points to the sub-sample population. Low program participation will have the same effect. The desired level of confidence and desired sampling error is also important. Technology-specific characteristics and system performance will also affect both monitoring and verification sampling decisions.

The evaluation team's current estimates of second year (i.e., Program Year 2002) program participation by technology and associated monitoring and data collection costs are addressed in Task 6 of this refined scope of work. These estimates are based on initial program participation by funding level and technology during 2001.

2.3 Program Status and Participant Characterization (Task 3)

While the true benefits of demand reduction programs depend on their demand impacts, it is useful to develop indicators of the extent to which certain implementation milestones have been reached. These markers are called *proximate* indicators because they are most closely linked to program activities.

As discussed in Task 1.1 above, the following are examples of likely proximate indicators that are considered useful for the SelfGen Incentive Program:

- Program incentive reservations and expenditures over time,
- Number and generation capacity of projects requesting funds, rejected and/or withdrawn from funding, and receiving funding approval,
- Distribution of incentive funds across technology and incentive level categories,
- Number of active manufacturers, system retailers, integrators, and installers by technology, and
- Development or operational status of reserved and funded projects over time.

Additional information on the characteristics of the equipment installed including technology type and capacity is useful. Both the proximate indicator and equipment characteristic information will be part of the information used to measure the success of the SelfGen Incentive Program.

Much of these data should be included in the Program Administrators' tracking systems of current participants and Withdrawn/Suspended/Rejected participants. Mail and/or telephone surveys will be used to identify participant and equipment characteristics deemed useful, but not initially included in the Program Administrators' tracking systems. Recommendations will be made to add these missing characteristics to the Program Administrators' tracking systems if they can be collected efficiently.

Task 3.1. Compile Program Administrator Maintained Data

The Program Administrators will be contacted regarding the data maintained in their respective program tracking systems (on applicants initially received, accepted, and approved to receive program funding) and their available tracking system data formats. RER will review this information and request the needed data and the desired data exchange format. This first dataset will be reviewed for completeness/accuracy and then prepared for the Task 5 analysis. Should significant problems with data quality/accuracy occur, RER will ask the respective Program Administrator to correct the identified problems or, if agreed to by all parties, RER will prepare/correct the datasets with the appropriate information obtained from the affected Program Administrator.

Task 3.2. Surveys of Program Applicants, Nonparticipants and Supply Channel Stakeholders

The participant data received from the Program Administrators will be reviewed for its completeness in providing desired participant and equipment/site information. These data will also be reviewed for consistency across Program Administrators. If additional

characteristics data are desired (either to expand beyond what is currently maintained by the Program Administrators or to complete missing data due to inconsistencies among the program administrators), a telephone or mail survey will be performed to gather the required information. After completing the survey, these data will be input to a database and prepared for the Task 5 impact analysis.

Task 3.3. Recommend Additional Administrator Tracking System Variables and Data Management Specifications

After completing Tasks 3.1 and 3.2, RER will review the variables available from each Program Administrator’s tracking system, the consistency of those data among the Program Administrators, and the preferred format for future exchanges of data from the Program Administrators to the independent evaluators. A working paper summarizing this review will be developed and submitted to the Program Administrators for review and comment. The results of this review and the recommendations and comments received will be included in each program evaluation/recommendations report.

2.4 Compile and Summarize Other Incentives Program Participation (Task 4)

The main objective of this task is to gather information from other available distributed generation or demand-side incentive programs and to ensure that the SelfGen Incentive Program Administrators are fully aware of their participants’ total incentive funding. Providing this information ensures that participants are not receiving more incentive funding than is intended (or allowed) by the SelfGen Incentive Program’s stated participation eligibility requirements in CPUC Decision No. 01-01-073. Cross-checking incentive data across different incentive programs is necessary to appropriately allocate participant, total program, and societal costs for purposes of estimating the cost-effectiveness of the various self-generation options.

In addition to the Emerging Buydown Program element of the CEC’s Renewable Energy Program (REP) for the Level 1 technologies, RER is aware of several other potential duplicative incentive program options. Potential incentive program funding sources include the following:

- 1) REP New Account bid auction performance payments for Level 3 technologies fueled with renewable resources (e.g., landfill gas, digester gas, livestock manure-based biogas fuels coupled with internal combustion engines or small/micro combustion turbines),
- 2) Participation in utility interruptible or curtailable load rate programs for load that is directly impacted by the distributed generation system,

- 3) Potential duplication of SelfGen Incentive Program incentive applications in SoCalGas and SCE service areas (if the program is not administered solely by SoCalGas, as suggested in the CPUC's March 27, 2001 Decision/Interim Opinion),
- 4) CEC Public Interest Energy Research (PIER) Program solicitation funding (most likely to occur in either the Renewable Generation or Environmentally Preferred Advanced Generation program areas),
- 5) U.S. Department of Energy or National Renewable Energy Laboratory project solicitation funding, and
- 6) Distributed generation incentives resulting from future sole-source contracts by enacted legislation (e.g., SB 5X, AB 29X, etc.).

Task 4.1. Identify Other Potential Incentive Programs

The purpose of this task is to identify those participants in the SelfGen Incentive Program who also participate in similar incentive programs, such as the CEC's or others identified above. During this two-year evaluation, similar incentive programs beyond those sponsored by the CEC and utilities may be offered by other governmental or utility organizations. As a key element of this task, both literature and Internet reviews will be performed at least twice each year to determine if other new utility, state, or federal agency programs now exist. Moreover, RER will describe their primary essential eligibility and incentive funding provisions.

Task 4.2. Survey of Program Participants – Other Program Incentives

As a part of the telephone or mail survey to be performed under Task 3.2, RER will determine if SelfGen Incentive Program participants also are participating in other related incentives programs. After identifying other similar incentive/funding programs, questions will be developed to address the needed project participation details. At this point, the applicable agencies/Program Administrators will be contacted by RER for the appropriate information. This survey data will be combined with the SelfGen Incentive Program information under Task 4.3.

Task 4.3. Summarize Program Participation for all Participants

The combined data and analysis results from the overall survey effort will be summarized in text (and, if appropriate, graphics) form and included in each required program evaluation/recommendations report.

2.5 Determine System Operational Characteristics (Task 5)

Introduction

Data from all available sources will contribute to the compilation and analyses of the funded self-generation system operational characteristics. These data sources will likely include 1) a program tracking database, 2) participant end-user survey data, 3) investor-owned utility (IOU)/energy service provider electric metering data of net system output, and 4) other required operational data (i.e., recovered thermal energy, natural gas consumption for Level 1 (renewable fueled) fuel cells, etc.) to be collected under Task 6 as part of these system verification and program evaluation efforts. Since operational data will not be available until the second program year (2002), these subtasks will not be completed until the collection of data associated with the second program year peak operations impact assessment report.

Some of the essential measures of performance that may be used to quantify the many benefits from these on-site generation systems are described briefly below. These proposed performance measures are followed by a description of the project team's program evaluation analytic approach.

Task 5.1. Compile and Summarize Electrical Energy Production by TOU Periods and Technology-Specific Factors

Participant/program monitored interval electric generation data will be used to summarize electrical energy production for "on peak," "mid peak," and "off peak" periods for which typical specifications are identified below. This will be done for each technology on an annual basis as well as for both summer and winter seasons. The photovoltaic and wind technologies under incentive Level 1 are expected to exhibit large degrees of variability where energy production is concerned. Unless energy storage is used as a peak shaving strategy, the output of photovoltaic systems during "off peak" periods is expected to be modest. For this Level 1 technology "off peak," electrical production will occur primarily on weekends.

The allocation of any small wind system electrical energy production across daily periods and seasons is much more difficult to predict and is strongly dependent on regional and local topography. For Level 2 and 3 technologies relying on non-renewable fuel, the distribution of electrical energy production across periods and seasons will depend not on energy resource availability, but rather on thermal load requirements, electrical consumption profiles, and on the relative costs of self-generating electricity versus electricity purchased from the utility.

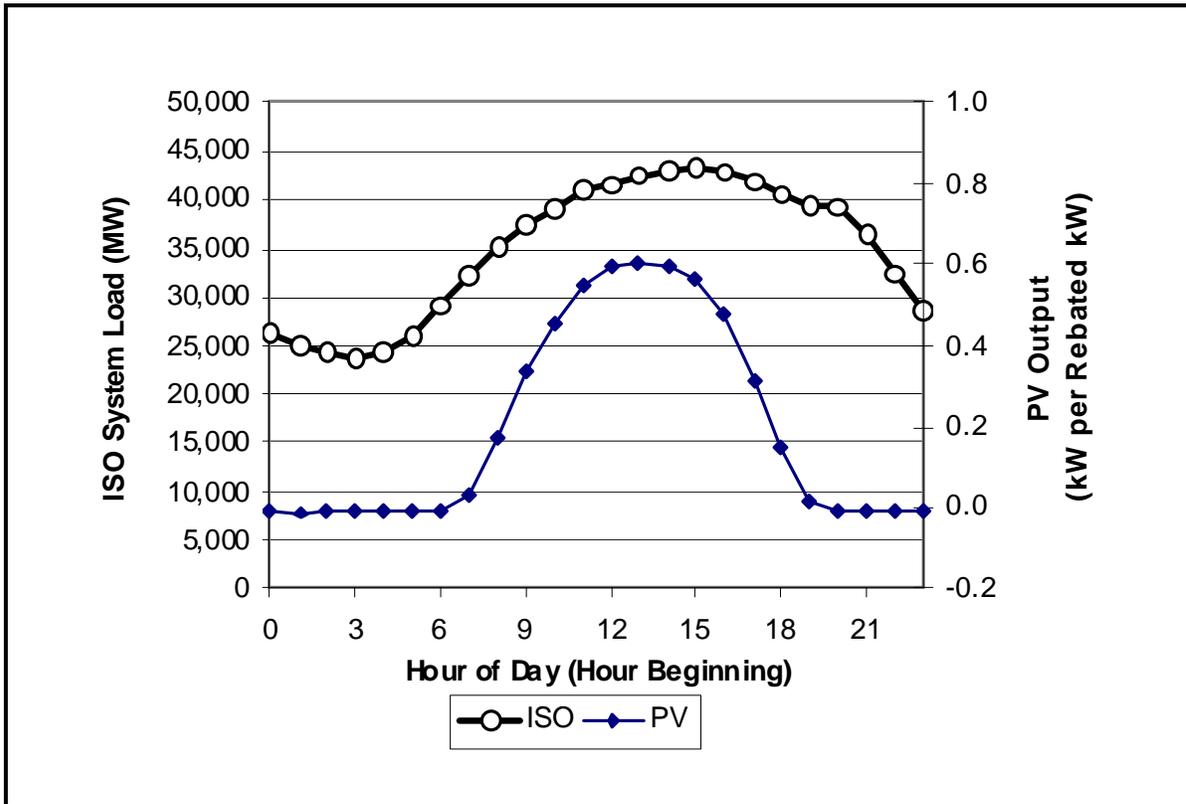
Task 5.2. Compile and Summarize Electrical Demand Reduction by TOU Periods and Technology-Specific Factors

The timing and magnitude of electric demand reduction is of concern to both electricity suppliers and consumers whose tariff includes an explicit billing demand component. This is expected to be the case for most of the customers participating in the SelfGen Program. For each technology and incentive level category, hourly average electrical demand reduction profiles will be estimated for several utility billing periods (i.e., “on-peak”, “mid-peak”, and “off-peak”), for both winter and summer months. In addition, the demand reduction impacts on the utility system will be estimated based upon the ISO Planning Area’s typical system peak-day(s) demand profile during that season.

Definitions for the utility TOU billing periods are identified in their rate schedules. Final billing period specifications for each utility will be determined during the implementation of the second year impact assessment. .

RER recently completed a similar analysis of average demand reduction yielded by small grid-tied photovoltaic systems rebated through the CEC’s Emerging Renewables Buydown Program. This analysis developed average production profiles for a sample of small photovoltaic systems, and compared an average power output profile to the profile of total California Independent System Operator (CAISO) demand on specific summer days. Figure 2-1 shows the results of this analysis.

Figure 2-1: ISO System Demand and Photovoltaic Supply on Three Summer Peak Days



The photovoltaic profile depicted in Figure 2-1 illustrates the fact that production profiles for renewable distributed generators may vary throughout the day. Production profiles calculated for photovoltaic and wind systems in the SelfGen Incentive Program will be different for the summer and winter seasons. While it is possible that production profiles for the Level 1 fuel cells could vary due to seasonal variations in fuel supply, Level 2 and 3 technology electrical production profiles will depend on other factors, several of which may include electrical consumption profile, thermal energy consumption profile, and fuel prices.

Demand reduction will be calculated for the participant project site and estimated for the overall electrical system. For the latter estimates, information concerning system transmission and distribution electrical losses will be incorporated. While typical values for low voltage losses are in the neighborhood of 5 to 10%, actual values for particular sites will deviate depending on the configuration and loading of the distribution network in the vicinity of the participating customer. To the extent that more accurate site-specific information concerning distribution losses is made available from Program Administrators or electric IOUs (i.e., specific customer interconnection voltage level and or estimated distribution losses), these data will be incorporated into the analysis of electrical demand reduction yielded by these evaluated self-generation systems.

Task 5.3. Determine Operating and Reliability Statistics – Availability and Capacity Factors

Availability and capacity factors of rebated on-site generation systems will be calculated and compared with expected values, based on the evaluation team’s previous on-site generation monitoring experience. Capacity factor expresses the relationship between system size and electric energy output and refers to the amount of energy that a system produces as a percentage of the total amount that it would produce if it operated at rated capacity during a specified period (typically one year). Capacity factors can be calculated directly using available interval metered electric output data.

Availability refers to the ability of a system to operate as designed during any given hour, regardless of whether it actually operates at full capacity during that hour. Availability is therefore a measure of hardware reliability and the related parameters of Mean Time Between Failure (MTBF) and Mean Time to Repair (MTTR). Availability will be calculated as the number of hours the generator is available to operate divided by the total number of hours in the period under consideration.

Data collection for availability and capacity factor analyses differ in at least one significant way. Whereas the output (and thus capacity factor) of on-site generating systems can be measured directly, unavailability cannot be measured directly. It necessarily follows that a generation system is available during the hours it is operating and producing electricity, however, when it is not operating, additional information is necessary to complete the availability analysis.

When a generation system is not operating, the “explanation for *lack of output*” enters into the availability calculation directly. In the case of Level 1 photovoltaic and wind technologies however, the issue of availability becomes more complicated and explanations for *lack of output* must be determined in order to inform the analysis of system availability. In the case of photovoltaics and wind, lack of renewable resource (i.e., insolation or pressure gradient/wind velocity) is a possible explanation for the absence of electrical output that would not count against a generator’s availability. If, on the other hand, absence of output were explained by an equipment failure, the hours affected by the equipment failure (whether they are daytime or nighttime) would reduce system availability.

Availability analyses for technologies that do not rely on intermittent energy sources are subject to similar issues where need to explain absence of electrical output is concerned. For technologies from all three levels, the availability analysis will rely both on interval-metered data, information collected during on-site verification visits, and end-user surveys. When data from these sources are insufficient to explain absence of on-site generator output, they

will be augmented with information obtained during follow-up calls to the participating customer.

Task 5.4. Determine Compliance with Thermal Energy Utilization and System Efficiency Program Requirements

Participating Level 2 and 3 technologies consuming non-renewable fuels are required to achieve certain minimum levels of thermal energy utilization (Public Utilities Code 218.5) and overall system efficiency. Recovered heat from systems smaller than 1 MW systems will typically be used for space heating or cooling, process or water heating, low/medium grade steam production, or desiccant dehumidification. This design approach can substantially increase overall system efficiencies, especially when applied to customers with medium to high thermal loads, such as process industries, hospitals, colleges and universities, hotels/conference centers, and large office buildings.

While microturbine thermal (fuel)-to-electrical efficiencies are approximately 26% to 29%, in combined heat and power (CHP) mode, overall system efficiencies of 60% to 80% are possible. Overall system efficiencies for fuel cells with heat recovery are comparable. Electrical efficiencies of new internal combustion engines typically exceed 30%, with system efficiencies capable of approaching 70% to 90% when both cooling jacket water and exhaust heat recovery streams are employed together.

Data needed to estimate system efficiencies actually realized will be collected and analyzed. Depending on operating characteristics, availability of existing heat rate data, and other factors, system fuel energy input will be measured or estimated as a function of measured electric output and manufacturer data concerning fuel input to electrical output conversion efficiency. If the latter approach is employed, the effects of system loading, altitude, and ambient weather will need to be estimated/accounted for in the calculations. It is expected that thermal energy totalizing instrumentation (i.e., ultrasonic flow rate sensor combined with temperature sensors, typical) will be used to measure the quantity of heat that is captured for a dedicated thermal end use.

Task 5.5. Compliance with Program Reliability Criteria

Program eligibility for technologies included under Incentive Level 3 after the end of 2001 entails meeting certain requirements concerning electric system reliability. On January 18, 2002, the final SelfGen Incentive Program reliability requirements were specified by the CPUC's Energy Division and are effective for projects applying to the program in 2002 on through the end of the program. During the evaluation phase of the program, the evaluation team will review the new reliability-related provisions of the revised program handbook and application materials. These requirements include meeting certain power factor criteria and, for systems greater than 200 kW, notification of planned maintenance activities with the local

electric utility. The evaluation contractor will then monitor a sample of sites (as data requirements dictate) and assess the degree to which these reliability-related claims are carried out with the operating performance of the program's self-generation systems observed in the field.

Task 5.6: Determine Compliance of Level 1 Systems with Renewable Fuel Usage Requirement

Level 1 fuel cells powered by renewable energy resources are required to satisfy certain requirements related to nonrenewable fuel supply as defined in FERC regulations for qualifying small power production facilities (18CFR 292.204). Specifically, their annual nonrenewable fuel (e.g., natural gas) use is capped at 25% of total fuel input. This requirement is similar to those governing operation of several solar thermal electric/natural gas supplemented power plants currently operating in California, who refer to this parameter as the “*FERC Fuel Usage Ratio.*”

Whenever possible, the approach to be used, based upon the available project metered data, will include an assessment of the fuel cell's metered annual natural gas fuel energy input as a percentage of the fuel cell project's total annual fuel input. If multiple fuel cells are employed in a single project at the same site, then the combined fossil fuel usage at all fuel cells at the site will form the basis for 1) project fossil fuel consumption, 2) total renewable fuel input, and 3) total annual energy input. In the case where renewable fuel input is not metered (for volume and energy content), then manufacturer efficiency data combined with electric production data will be required to estimate the total annual fuel input.

2.6 Task 6: Implement On-Site Monitoring, System Data Collection, and Field Verification/Inspections

One of the primary goals for the independent evaluation firm to accomplish under this program effort is the development of an appropriate statewide performance data collection structure. The performance issues are from both an electrical and thermal perspective. Data collection/monitoring will be necessary in order to obtain all of the required operational performance data for the funded systems.

In accordance with the revised Program Evaluation RFP, electrical generation output data will be collected and provided by the local electric utility and/or the Program Administrator. Net electric generation output data will be collected for a census of program participants. The electrical performance criteria for this program have not been explicitly defined and agreed upon as yet, but these factors will inevitably concern the timing and level of generation and will require a form of electric interval metering.

The CPUC issued Decision 01-03-073 requiring Level 3 technologies receiving incentives under the program to meet several additional criteria. With respect to thermal performance, Incentive Level 2 and 3 systems must use the waste heat from the generating facility, specifically meeting the cogeneration requirements of Public Utilities Code Sec. 218.5. Public Utilities Code Sec. 218.5 defined the use of thermal energy to be subject to the following standards: a) at least 5% of the facility’s total annual energy output shall be in the form of useful thermal energy; b) where useful thermal energy follows power production, the useful annual power output plus one-half the useful annual thermal energy output equals not less than 42.5% of any natural gas and oil energy input.

To complete the necessary data collection and analysis effort for this evaluation, RER and its team members have designed a monitoring plan including the appropriate type of BTU/flow meters, data loggers, sensors, and ancillary equipment in order to address each of the self-generation technologies included in the program.

RER’s team consists of three firms that will be involved in system verification, monitoring, and data collection activities. To reduce implementation costs under this program evaluation scope element, the team will perform this fieldwork out of three Northern California offices (San Ramon, San Francisco, and Roseville) and two Southern California office locations (San Diego and Brea-Orange County). This approach should greatly reduce the travel and per diem cost impacts of the program’s statewide geographic boundaries within the four IOU service areas.

The technical approach for each of the eligible technologies/fuel types under program incentive Levels 1, 2, and 3 are discussed briefly below.

Task 6.1: Program Incentive Level 1 Monitoring Requirements

Based on “4.6.2 Monitoring Peak Demand Reductions” in CPUC Rulemaking 98-07-037, decision 01-03-073 March 27, 2001: “INTERIM OPINION: IMPLEMENTATION OF PUBLIC UTILITIES CODE SECTION 399.15(b), PARAGRAPHS 4-7; LOAD CONTROL AND DISTRIBUTED GENERATION INITIATIVES”

http://www.cpuc.ca.gov/WORD_PDF/FINAL_DECISION/6083.PDF):

Energy Division’s proposal for the self-generation program does not impose operating requirements or establish differential incentives for Monitoring Peak Demand Reductions related to on-peak operation. As a result, SDG&E/SoCal argue that the proposed program design does not ensure that generation units will contribute to peak demand reduction. PG&E also requests that we clarify whether units are required to operate during peak.

We are not persuaded that it is necessary or reasonable to impose operating requirements or incentives related to on-peak operation for this program. We

believe that customers willing to invest in self-generation already have sufficient economic incentive from energy prices to employ time-of-use meters to measure their usage and to operate their self-generation systems during peak periods. Moreover, the system output for solar technologies is generally coincident with afternoon system peak without any operating requirements. In addition, a per-watt or percentage of system cost up-front payment is already employed through the CEC’s Emerging Renewables Buy-Down Program (“renewables buy-down program”). Maintaining that approach should help minimize market confusion and disruption.

However, for program evaluation purposes, we will require program administrators to monitor the extent to which self-generation units installed under this program operate during peak periods. Program administrators should direct their independent evaluation consultants or contractors to develop a process for monitoring and collecting this data from program participants. At the end of the first program year, administrators should report to the Commission on peak operation from the program, and continue this reporting in subsequent years. By the end of the second program year, the consultants or contractors should present recommendations on incentive or program designs that could improve on-peak load reduction from self-generation.

We offer an example of how this operational data might be obtained for evaluation and ongoing program design purposes. If the self-generation unit does not already have built-in logging capability for this purpose, then the unit could be outfitted with a low-cost single-channel datalogger and sensor (such as a relay switch) which would at least enable the utility to determine when the unit is operating and producing electrical output. Program administrators should develop and disseminate the specific requirements for system installations and monitoring capabilities required for program evaluation. The costs of the required monitoring equipment should be paid from program funds.

The SelfGen Incentive Program Working Group’s revised RFP notes that the local utility will provide 15-minute meter data. For the task discussion below, it is understood that this data stream will provide unit (or facility aggregate) net generation. “Net” implies that generator “house” loads (controls, conversion losses, etc.) are included, but that customer loads are not.

Section III.5 of the revised RFP defines the operating characteristics that must be determined. The RFP states that the local utility will provide distributed generation energy production data for all systems in the form of 15-minute interval averages, and notes that no Level 1 project field performance monitoring is necessary. The utility-supplied information will be sufficient to determine the electrical production and electrical demand reduction. These data, along with customer O&M log information, will provide the basis for system operating and reliability statistics.

To determine if Incentive Level 1 fuel cells meet the renewable fuel requirements, the team will analyze annual net energy production and natural gas consumption through monthly bills along with an estimate of the average operating fuel cell conversion efficiency. When necessary, the utility will install a separate gas meter to monitor fuel cell system gas consumption. This approach should provide sufficient accuracy to determine compliance with the renewable fuel definition. Thus, the only evaluation contractor-installed monitoring equipment anticipated for this effort will be for Incentive Levels 2 and 3 waste heat utilization and system efficiency.

Fuel Cell Power Systems

Renewable fuel and natural gas input volumes will be obtained from the natural gas utility or renewable fuel supplier. Due to the cogeneration requirement for fuel cells in Level 2 of the program, instruments to measure the thermal energy flow rate at the outlet of the cogeneration system will be installed to demonstrate the level of benefit on an annual basis. Useful cogeneration system thermal output will be assumed to be the thermal output of a heat exchanger using liquid water as the working fluid. We anticipate that long-term monitoring will be employed for all Level 2 and 3 technologies under the SelfGen Incentive Program. In any case where short-term thermal monitoring is selected, non-invasive, ultrasonic flow, and surface temperature measurements will be used to speed installation and removal and to minimize the project's impact on the customer and their self-generation system. In this case, impact to the customer should be limited to a few hours of down time both for equipment installation and again during system removal.

Photovoltaic Systems

The revised RFP clearly indicates that interval-based electric generation output meter data will be provided to the M&E consultant by the electric utility. Therefore, we do not propose at this time any true performance monitoring of Level 1 photovoltaic systems that would need to include certain environmental data (direct and diffuse solar insolation, module temperature or ambient temperature and wind speed, etc). Should the SelfGen Incentive Program's field verification and system inspection activities uncover a need for troubleshooting a problem system, Endecon Engineering can provide this service (as an optional task) at the request of any Program Administrators. In such cases, short-term monitoring may be required to address any complex system or component performance problems. Grid-connected photovoltaic system output is primarily a function of irradiance on the photovoltaic modules and the module temperature. For purposes of this type of monitoring, distinguishing the locations of problems (i.e., arrays and inverters) is the objective, so the monitoring of DC inputs to the inverter(s) is necessary. LICOR pyranometers, hall-effect DC probes, and thermocouples or thermistors will likely be used to monitor these inputs.

Small Wind Systems

Again, the revised RFP clearly indicates that interval-based electric generation output meter data will be provided by the local electric utility, and to date, wind system applications in the program have yet to be identified. Therefore, the team does not propose any performance monitoring of Level 1 wind turbine systems that would need to include environmental data (i.e., average data interval wind speed at turbine hub height). If required for optional system troubleshooting purposes, an anemometer measurement of wind speed can generally be relied on to provide wind speed measurements from 0.5 to 50 m/s, while a wind turbine may only operate in winds as low as 4 to 6 m/s.

If requested, an NRG cup anemometer will be used to measure this resource as close to the hub height as possible without being affected by the turbulence of the turbine blades themselves. Estimated price does not include a separate anemometer tower. For example, a 10-meter tower would add \$500 in materials and \$250 in labor. Note that the NRG uses one of the two available pulse inputs, which would be incompatible with reading from more than one pulse initiating kWh meter.

Task 6.2: Level Two Fuel Cell Monitoring

Btu metering equipment may be installed to monitor waste heat utilization and system efficiency on Level 2 and Level 3 systems for the duration of the program's M&E support contract to characterize overall system performance and review observance with system efficiency requirements. Data logging equipment will be installed to monitor and download waste heat utilization and system efficiency on Level 2 systems, characterize performance, and verify compliance with system efficiency requirements. Equipment installations will likely be either permanent or longer term in nature.

Natural gas input volume will be obtained from the utility or renewable gas supplier. Due to the cogeneration requirement for fuel cells in Level 2 of the program, measurement of the energy flow rate at the outlet of the cogeneration system will be performed to demonstrate the level of benefit. Useful fuel cell cogeneration output will be assumed to be the thermal output of a heat exchanger using liquid water as the working fluid. It is anticipated that long-term continuous monitoring will be employed for all Incentive Level 2 and 3 technologies under the program. Only under the condition where monitoring is short-term in nature, will non-invasive, ultrasonic flow and surface temperature measurements be used to speed installation and removal and to minimize the project's impact on the customer and their distributed generation system. Impact to the customer should be limited to a few hours of down time for equipment installation and removal.

The key Level 2 useful thermal energy monitoring system components will include the following:

- Data logger, modem, and accessories,
- Hot water Btu meter, and
- Telephone/communications line.

Task 6.3: Incentive Level 3 Monitoring Requirements

The monitoring requirements for Incentive Level 3 technologies, including microturbines, internal combustion engines and small gas turbines less than 1.5 MW of gross generation capacity, will generally parallel those of the Level 2 fuel cells.

The key Level 3 useful thermal energy monitoring system components will include the following:

- Data logger, modem, and accessories,
- Steam flow and temperature sensor or hot water Btu meter, and
- Telephone/communications line.

Equipment Specifications and Costs

Retroactive Eligibility – Grandfathered Projects (w/o existing electric metering)

As stated in the SelfGen Incentive Program Handbook, Level 2 and 3 technologies with a completion date on or after March 27, 2001 will be eligible to apply for retroactive incentive funding under this program. To date, there have been two generation projects within the SCE service area that have applied and qualified under this provision.

The budget estimates below were developed after conversations with Program Administrators and a review of the process schematics for two plants and represent the estimated costs for both projects combined. A site visit by Brown, Vence & Associates (BVA) accompanied by a contractor will provide more definitive site-specific costs. The rough cost estimates for the site visits are detailed below.

Preliminary Plan \$ 600

Site Visit

Measurement Plan, Firm Pricing, Walk Contractor	\$1,200
Air Fare	\$ 175
Car Rental	\$ 75
Parking, Mileage & Misc.	\$ 60

Follow-Up Visit

Verify Instrument Installation Test System	\$1,200
Air Fare	\$ 175
Car Rental	\$ 75
Parking, Mileage & Misc.	\$ 60

Electric Metering

(2) Power Measurement Laboratories Model 7500 w/ logger & Modem	\$8,200
Meter Installation	Contract \$ 500
Phone Line	Contract \$ 300

Thermal Metering

(2) Onicon BTU Meter System 1 w/ F1200 Insertion Flow Meter	\$4,600
Mechanical Installation, 2-1" Tap & 4-3/4" Tap	Contract \$ 700
Instrumentation Wiring	Contract <u>\$2,000</u>

Total BVA Labor	\$3,000
Total Contract	\$3,500
Total Material	\$12,800
Expenses	<u>\$ 620</u>
Sub Total	\$19,920

Tax @ 8.25% of Material	\$1,056
Shipping @ 5% of Material	\$ 640
G&A @ 10% of Contract, Material & Expenses	\$1,692

<u>Total for Two Sites</u>	\$23,308
<u>Cost per Site</u>	\$11,654

Additional Costs

Maintenance	@ 15% of Material/yr	\$/yr (per site)	\$ 960
Data Handling		\$/yr (per site)	\$1,440

Level 2 and 3 Instrumentation and Continuous Thermal Monitoring

Information developed for the two retroactively eligible sites provides a reasonable basis for estimation of project instrumentation and continuous monitoring costs for other Level 2 and 3 sites in the program. However, while the costs shown in the estimate above are applicable to these sites (with the notable exception of generator gross electric metering), there are some factors to be considered in extending them to the more general situation.

- ***The number of sites to be instrumented at one time.***
Visiting more than one site per trip lowers the cost per site. The attached estimate applies to visiting two sites on the same trip.
- ***The amount of instrumentation that can be purchased at a time.***
The larger the number of items we can purchase at a time, the greater bargaining power we have with vendors to obtain the lowest possible prices. The prices referenced in our estimate are manufacturers' list prices. In the quantities we expect to buy equipment, we should be eligible for discounts from these prices.
- ***Complexity of the system.***
This estimate is for systems with a single closed water loop for the heat recovery. If the transfer medium were steam, more expensive instrumentation would be required. For example, the instrumentation required for a steam application could add as much as \$3,000 per site. Further, if the system has more than one end use, additional instrumentation costs are to be expected because of the need to install separate monitoring for each energy stream.
- ***Accessibility of the equipment.***
If the equipment is not physically accessible or if access is restricted due to operational concerns, the costs may increase. If, for example, instrumentation can only be installed during off hours, labor costs will be greater. If it is not possible to install instrumentation at the necessary points of the system, additional or more expensive equipment may be required.

Taking into consideration all of the above factors, we estimate a reasonable budget estimate for Level 3 sites excluding maintenance and data handling to range from \$5,500 to \$11,000 per site.

Revised Program Participation Estimates

Using the first year's program application data, a revised estimate of the level of participation has been made for the purposes of providing a realistic estimate of the budget requirements for metering and monitoring. These estimates represent an educated guess and not a sophisticated forecast. The underlying assumptions are that in the first year the participation rate was an average 32 applications per month with this falling to approximately half (16 per month) starting in program year 2002. Rejections and cancellations during the first stages of the incentive reservation process are estimated to be 40%. The dropout rate in the final stages of the process is assumed to take an additional 10% of the original applicants resulting in an overall dropout rate of 50%.

The distribution of technologies that applied to the program in the first year and the following distribution estimate was developed for use in estimating the distribution in all future years. Assuming a reduced level of applicants in all future years, Table 2-4 illustrates the expected participation in PY2001 through PY2004 for each technology.

Table 2-4: Estimated Program Participation

Technology		PY2001	PY2002	PY2003	PY2004	Total
Level 1	Photovoltaic	40	34	34	34	142
	Fuel cell w/renewable fuel	0	0	0	1	1
	Wind	0	1	0	1	2
Level 2	Fuel cell	2	2	2	2	8
Level 3	Microturbine	18	15	15	15	63
	IC w/heat recovery	52	44	44	44	184
	Sm. turbine w/heat recovery	0	1	0	1	2
Retroactively Eligible Projects		2	0	0	0	2
Total		114	97	95	98	404
Cumulative Total		114	211	306	404	

Task 6.4: Monitoring Systems Data Collection

System data collection is included within the scope and discussions of Tasks 6.1 (Level 1) 6.2 (Level 2) and 6.3 (Level 3 Systems) above.

Task 6.5: Administrator Field Verification/Inspection Review

Consistent with program evaluation procedures, a small sample of eligible systems (Levels 1, 2, and 3) will be field-verified by the RER consultant team to determine that the system installed is fully consistent with program documentation (including the rated output versus incentive level to be paid) and that the system is fully operational and performing at expected levels of generation. This field verification process review effort will be coordinated by RER.

2.7 Recommendations to Improve On-Peak Load Impacts (Task 7)

The evaluation contractor team members will analyze the program records, inspection/verification records, and all available performance monitoring data for each program incentive level and technology to assess 1) the on-peak availability and load impacts, and 2) the contribution to (or impacts upon) the system peak load. As an example, for Incentive Level 1 technologies under the CEC’s Emerging Buydown Program, RER found that a number of field-verified (spot-metered) photovoltaic systems were not functioning appropriately (as designed) for numerous technical reasons. These reasons included system wiring/integration losses, inverter voltage control problems, photovoltaic array mismatch, electric safety component failures, battery system parasitic load and maintenance, lack of panel dust control, among others. On average, only about 73% of the

rated system capacity was available during ideal PTC (PVUSA Test Conditions) conditions, and less than 60% of the modules PTC capacity was actually found to be available coincident with the California ISO system peak demand.

Based on similar peak demand period performance analyses for all Level 1, 2, and 3 technologies, RER will provide to each utility, as appropriate, program recommendations in order to improve on-peak performance and the resulting on-peak system load impacts. RER will also summarize the statewide results for the entire SelfGen Incentive Program.

2.8 Task 8: Perform a Comparative Program Administrator Impact and Process Assessment (Utility vs. Non-Utility)

Under this task RER will perform the utility and non-utility administrator assessment following the second year of the program (i.e., after the end of 2002). RER proposes to complete this task using three different techniques. The first two involve segmenting the analyses performed in the earlier tasks between the programs managed by utility program administrators and the program managed by SDREO. The third will include an in-depth survey of program participants and the Program Administrators under the two types of program administrator structures.

Proximate Indicator Analysis

Under Task 3, participant characteristics data will be collected during each program year and proximate indicators developed using a number of criteria, including the following:

- Total program committed expenditures and incentives funds paid out to applicants over time,
- Number and generation capacity of projects requesting funds, rejected from funding, and receiving funding approval,
- Distribution of incentive funds across technology and incentive category,
- System installers by technology, and
- Development or operational status of funded projects (i.e., point in the development process).

Within the context of the administrators' respective budgets and their customers' respective overall retail electric and gas rate structures providing the primary economic incentive, comparing these proximate indicators between the two types of program administrators should provide general insight as to which organizational structure is the more successful in promoting the growth of self-generation. Any significant variance in electric and natural gas

retail rates across the administrators' participants will be incorporated into the assessment, if possible, through a correlation of retail rates with distributed generation market activity.

Operational Data Comparison

In addition to comparing proximate indicators, the operational data assessed within Task 5 will be compared between the two types of program administrators. The ability to insure compliance could greatly impact the success of the program. System production levels and operating and reliability statistics are less the function of the system administrator and more of a reflection of the quality of the program participants. However, significant differences in these characteristics between the two administrator types could indicate flaws in the review process used to approve the participant's applications.

In-Depth Surveys

An in-depth telephone survey will be conducted on a sampling of the program participants under each of the two types of program administrator structures. Questions will be asked that attempt to assess the program delivery systems provided by each administrative structure and whether program participants found one more useful than the other. In addition, questions will be asked that will attempt to discern the perceived attitudes and support toward both self generation in general and their specific distributed generation projects held by the program administrators, as viewed by the program participants.

2.9 Task 9: Annual Program Evaluation Reports

Two sets of annual evaluation reports will be completed for this study: one for the first program year (with a process focus) and one for the second program year. Each report represents a compilation and integration of the results from each of the tasks in this program evaluation work plan. The exception to this rule is the Task 8 deliverable, which will include a separate utility vs. non-utility program administration report.

Development of these various reports is a separate task in this work plan for two reasons: 1) they include the compilation of results from multiple tasks, and 2) the long-term nature and level of possible revisions after review of the report development.

2.10 Task 10: Other Project Deliverables and Reporting

The RER Project Manager will maintain close contact with both the SCE Project Manager and the statewide team of Program Administrators. Monthly status reports will be provided to the SCE Contract Manager, along with weekly telephone updates on study task progress. In addition, special invoice/billing data reports and project schedule updates will be developed and provided upon request.

Other deliverables under this contract will include (as appropriate) notification of the SCE Program Administrator should a customer 1) deny access to the project site for the purposes of completing this evaluation, or 2) if the self-generation system has been removed by the participating customer. In addition, RER will provide the Program Administrators with a list of employees that will be responsible for visiting the participating customer's site a minimum of one week in advance of the site visit.

It is proposed that project meetings between the RER Project Manager and appropriate RER/subcontractor staff and the statewide team of Program Administrators be held on either a quarterly basis or at critical project milestones at a site to be specified by the SCE Contract Manager. Maintaining this close interaction will ensure that the overall program evaluation effort and the evaluation techniques employed by the team meet the expectations of both the SCE Project Manager and the statewide team of Program Administrators.

3

First Year Program Data Collection Activities

3.1 Overview

This section summarizes the first year data collection activities performed to support the California Public Utilities Commission's (CPUC's) Self-Generation Program Evaluation (SelfGen Incentive Program). In particular, data were collected from numerous sources to support the program status reports, participant characterization, and process evaluation tasks, as discussed in the next two subsections of this report. The following data sources were used in the first year evaluation:

- Program Administrator tracking data,
- Program Administrator interviews,
- Host customer surveys,
- Supplier surveys, and
- Nonparticipant surveys.

The following subsections describe each data collection effort. Copies of the survey instruments are included in appendices.

3.2 Program Administrator Program Tracking Databases

Each Program Administrator developed its own SelfGen Incentive Program tracking system. These systems include hard copy files and electronic data. All Program Administrators track at least the basic information contained in the SelfGen Incentive Program application forms. These data include the following:

- Applicant's contact information,
- Host customer's contact information,
- Incentive requested and/or granted,
- Basic system details (type of technology, size, and cost), and
- Status of the application.

All the Program Administrators have detailed checklists (either hard or soft copy) for each application. The form and content of the electronic tracking data varies across Program

Administrator, with some keeping their data in Excel files, while others use Access or web-based databases. At the time of the Program Administrator interviews, two of the Program Administrators were in the process of re-designing their tracking systems. The content of these tracking systems is addressed in detail in Section 4.2.

The project team requested copies of the electronic tracking data from each Program Administrator, primarily to aid in the participant characterization task because these data provide proximate indicators of program activity over time. The tracking data also indirectly helped with the process evaluation task, since they were used in the design and administration of the host customer, supplier, and nonparticipant surveys.

The project team reviewed the Program Administrator tracking data and contacted each Program Administrator to resolve questions about the data. Each Program Administrator provided a single point of contact who would interact with that Program Administrator's database manager to answer questions when necessary. After reviewing the electronic tracking data provided by each Program Administrator, the data were standardized to create a detailed statewide tracking database. This database is the source of many tables and figures in Sections 4, 5, and 6. Section 4.2 includes recommendations for tracking self-generation applications for the remainder of the program.

3.3 Program Administrator Interviews

In-depth interviews were conducted with each Program Administrator and with SDG&E.¹ Before the interviews, each Program Administrator received an outline of the interview, along with a checklist of materials and data that would be required during the interview. At least one member of RER's senior staff participated in each interview. There were three to four representatives for the Program Administrator. These representatives generally included, at the least, the Program Manager, a marketing specialist, and a database manager.

The interviews ranged in time from three to four hours. The results were entered into a Program Administrator Interview Guide. This guide, like all the survey instruments used in the data collection efforts, was developed by the project team with input and review from the Working Group. For several days following the interview, the Program Administrators and project team corresponded to fill in gaps and refine the information provided for certain questions. At the end of this correspondence, the project team summarized the interviews, individually and collectively. Copies of the Program Administrator Interview Guide and supporting data request materials are provided in Appendix A.

¹ The San Diego Regional Energy Office (SDREO) is the Program Administrator for customers in the SDG&E service territory.

The primary focus of these interviews was to provide information to support the Process Evaluation and Evaluation Criteria G6B, G7A, and G8A. The main topics covered in the interviews included the following:

- Program performance,
- Program design,
- Supply channel and installation issues,
- Application process,
- Barriers to program participation,
- Project verification and metering, and
- Marketing and consumer education.

3.4 2001 Host Customer Survey

RER staff conducted face-to-face interviews and in-depth telephone surveys with host customers who participated in the SelfGen Incentive Program in 2001.² In particular, an in-depth telephone survey instrument was designed and administered to 84 host customers. The survey was also conducted face-to-face with three host customers who were in the advanced stages of the SelfGen Incentive Program application process. The face-to-face interviews with Advanced Stage applicants were used to ensure that information was garnered from host customers who are closest to completing or have completed the application process. These interviews and surveys focused on issues related to the process evaluation and participant characterization tasks, which are covered in the next two report sections. The main topics covered during the interviews and surveys include the following:

- Program design,
- Business characterization of the host customer,
- Reasons for installing distributed generation,
- Difficulty of various stages of project development, and
- Overall satisfaction with the program.

A host customer's familiarity with each of these topics depends largely on the level of involvement with their self-generation project, the stage of their application, and the status (active or inactive) of their application. The last two factors can be determined using the Program Administrator tracking data. The involvement of a host customer can only be

² "Host customer" refers to the end user of the self-generation system. In about one-fourth of the cases, the host customer also served as the applicant to the program.

determined during the actual interview.³ As such, the tracking database was used to assign each 2001 host customer to one of the following application categories.

- ***Withdrawn/Rejected/Suspended.*** This category refers to 2001 host customers whose applications have been withdrawn, rejected, or suspended as of March 2002 (even if the withdrawal, rejection, or suspension occurred in 2002).
- ***Advanced Stage.*** This category refers to 2001 host customers who submitted proof of project advancement by December 31, 2001, and whose application has not been withdrawn, rejected, or suspended as of the end of March 2002.
- ***Early Stage.*** Early stage refers to 2001 host customers who have not submitted proof of project advancement by December 31, 2001, and whose application has not been withdrawn, rejected, or suspended as of the end of March 2002.

The host customer sample design, telephone survey instrument, interview guide, completed sample sizes, and development of survey weights are discussed below.

2001 Host Customer Sample Design

A stratified sample design was developed for the 2001 host customer survey. In particular, the population of 2001 host customers was stratified by application status, Program Administrator, and distributed generation technology. A sample size of roughly 100 completed surveys was used as a guide in developing the sampling strategy. Further, an expected 60% response rate among Withdrawn/Rejected/Suspended host customers and an expected 80% response rate for all other host customers was used. As such, a sampling approach was used that attempted to contact the entire population of host customers in each stratum, with the following exceptions.

- ***Subsample Withdrawn/Rejected/Suspended Host Customers from the Photovoltaic and Internal Combustion Engine Strata.*** Due to the relatively large number of Withdrawn/Rejected/Suspended host customers from the photovoltaic and internal combustion engine strata, a sample of 10 completed surveys for each of these two technologies was targeted. The sample targets were allocated proportionally by number of applicants in these strata across Program Administrators to ensure that each Program Administrator was represented for each technology.
- ***Subsample Early Stage Host Customers from the Internal Combustion Engine Strata.*** Due to the relatively large number of Early Stage internal combustion engine customers, a completed sample of 50% of host customers in these strata was targeted. The sample targets were allocated proportionally by number of applicants in these strata across Program

³ The use of a third party applicant does not necessarily indicate lack of involvement on the host customer's part and vice versa. Therefore, the presence or absence of a third party applicant could not be used to determine the host customer's level of involvement.

Administrators to ensure that each Program Administrator was represented for each technology.

Survey Instrument Design

Three host customer survey instruments were developed by the study team with input and review from the self-generation Working Group. In particular, a survey instrument was developed for each of the three application status categories. These surveys were differentiated by questions tailored to each application status and stage of completion of the self-generation project. For example, the Withdrawal/Rejection/Suspension survey instrument included questions about reasons for the cancellation of the application. The Advanced Stage survey included detailed questions about project construction. However, all three survey instruments focused on process evaluation and participant characterization by asking questions about the topics listed above.

Appendix B contains copies of the three survey instruments.

Survey Implementation

Most of the host customer in-depth interviews were conducted via telephone. Senior RER staff completed all interviews of Advanced Stage host customers and Early Stage customers who had more than four applications in 2001. Three of these host customers were interviewed in person.⁴ The typical interview length was 15 to 30 minutes for the telephone interviews and one to two and a half hours for the in-person interviews. For telephone interviews, the project team called each host customer at least four times, or until that host customer's sampling stratum target was met. When the host customer could not be reached on the first call, the interviewer left a detailed message. Interviewers generally did not leave messages on subsequent calls to avoid hassling the potential respondent.

Completed Sample

Table 3-1 summarizes the completed sample. Included in the summary is the sample population, targets, and completed sample by Program Administrator, technology type, and application status. The number of completed interviews does not match the target for every stratum because actual response rates were slightly lower than expected. This was due, in general, to the inability to speak directly with the host customer contact person within the survey protocol of four calls. Once the contact person was reached, they were generally very cooperative. The host customer contact refused to be interviewed in only 14 cases.

⁴ Two of these were selected for in-person interviews because they had a large number of self-generation projects. The third was chosen because they served as both the host customer and the applicant.

Table 3-1: Summary of 2001 SelfGen Incentive Program Host Customers Sample Design and Completed Surveys

	PG&E			SCE			SDREO			SoCal Gas			Total		
	Popu- lation	Target Inter views	Completed Interviews	Popu- lation	Target Inter views	Completed Interviews									
PV			0												
advanced	1	1	0	0	0	0	1	1	1	0	0	0	2	2	1
early	22	18	8	4	3	4	3	2	3	3	2	2	32	25	17
wd/rej/sus	14	4	4	10	4	2	2	1	0	2	1	1	28	10	7
Fuel Cell															
advanced	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0
early	2	2	1	1	1	0	0	0	0	0	0	0	3	3	1
wd/rej/sus	1	1	0	0	0	0	0	0	0	2	1	1	3	2	1
Microturbine															
advanced	0	0	0	0	0	0	1	1	1	0	0	0	1	1	1
early	2	2	1	1	1	1	11	9	6	11	9	7	25	21	15
wd/rej/sus	0	0	0	2	1	1	2	1	2	7	4	4	11	6	7
IC Engine															
advanced	0	0	0	0	0	0	2	2	1	1	1	1	3	3	2
early	23	10	11	7	6	3	3	2	2	25	10	9	58	28	25
wd/rej/sus	4	2	2	8	3	2	5	2	1	8	3	2	25	10	7
Total	70	41	27	33	19	13	30	21	17	59	31	27	192⁵	112	84

⁵ This is less than the total number of 2001 applications (262) because some host customers submitted multiple applications. Host customers with applications across multiple technologies and/or multiple Program Administrators were assigned a “primary” technology and Program Administrator, based on their most advanced application.

Host Customer Survey Weights

Expansion weights for each host customer were developed. The expansion weight for a particular host customer is equal to the population of host customers in that particular stratum divided by the number of completed interviews for that stratum. For example, each sampled Early Stage photovoltaic customer in PG&E's territory received a weight of 22/11. The sum of all weights of sampled host customers equals 192, which is the total population of 2001 host customers. These weights are used when analyzing results across strata in the subsequent sections of this report.

3.5 Nonparticipant Survey

A stratified random sampling design was developed for the survey of nonparticipating businesses located in the electric service territories of PG&E, SDG&E, SCE, and LADWP.⁶ The project team agreed upon a target sample size of 300 completed surveys based on the estimated length of each survey and available budget. In particular, the nonparticipant sample was stratified by business type and electric service territory. The target for each stratum was selected based on that stratum's proportional share of total estimated electrical consumption in 2000,⁷ and adjusted to reflect the stratum's volume of self-generation activity. In particular, the sample of 300 was distributed across building types based on relative proportion of total kWh consumption. Table 3-2 summarizes the percentage of electricity usage by building type and utility. This distribution was adjusted by oversampling for business types that were heavily represented in the SelfGen Incentive Program, as indicated by the tracking data and host customer interviews. Table 3-3 shows the distribution of host customers by building type, based on the host customer interviews. As shown, manufacturers, transportation, communications, and utilities (TCU), miscellaneous commercial, lodging, and office were the most heavily represented building types among the 2001 host customers. SDG&E and LADWP service territories were also over sampled, since sample sizes based purely on electricity consumption would have resulted in insufficient sample sizes for these two territories.

⁶ LADWP was the only municipal utility included in the survey. It was necessary to include LADWP in order for SoCalGas' service territory to be adequately represented.

⁷ The estimates of electrical consumption by business type and electric utility service area were obtained from the CEC's reports on California Energy Demand and EPRI's 1998 Energy Market Profiles (citations below). (CEC. 1995. *Staff Report. California Energy Demand. 1995-2015. Volumes III-VII.* Sacramento, CA) (EPRI. 1999. *Energy Market Profiles. Volume 3: 1998 Industrial Buildings, Equipment, and Energy Use.* MA-114434-V3. Palo Alto, CA)

Table 3-2: Electricity Consumption for the LADWP, SDG&E, PG&E, and SCE Electric Service Territories

	SDG&E	PG&E	SCE	LADWP	Total Electricity consumption (GW-Hrs)	Percent of Sector	Percent of Total
Commercial							
Office	1,772.4	7,071.9	7,416.1	4626.2	25,055	30%	15%
Restaurant	706.9	1,320.4	1,487.3	654.1	6,706	8%	4%
Retail	611.5	1,746.2	3,586.8	761.3	10,118	12%	6%
Food Stores (food/liquor)	1,006.4	2,829.3	4,991.2	1290.7	9,808	12%	6%
Warehouse (Refrigerated and Un-refrig)	811.4	4,258.8	3,839.8	897.7	5,384	6%	4%
Schools	279.5	2,127.1	1,598.5	495.8	2,795	3%	2%
Colleges	87.4	482.0	247.6	65.8	2,637	3%	2%
Hospitals (health care)	318.4	776.5	1,392.8	307.7	8,532	10%	5%
Lodging (hotels)	419.7	638.4	1,026.5	552.5	3,190	4%	2%
Misc	1,138.0	3,441.3	3,006.1	947.0	9,952	12%	6%
<i>Total Commercial</i>	7,151.6	24,691.9	28,592.7	10598.8	84,177	100%	52%
Industrial							
Manufacturing	1,630	17,988	20,918	3,701	44,238	84%	27%
Construction	68	750	872	154	1,843	4%	2%
Mining & Extraction	160	3,168	2,842	198	6,368	12%	4%
<i>Total Industrial</i>	1,858	21,906	24,632	4,053	52,449	100%	33%
Agriculture	266	5,991	5,323	144	11,724	100%	7%
TCU	1,500	4,876	4,658	1927	12,961	100%	8%

See Footnote 7.

Table 3-3: Summary of Surveyed Host Customers by Building Type

Building Type	Number of Host Customers	Percent of Sector	Percent of Total
Commercial			
Office	8	21%	10%
Restaurant	0	0%	0%
Retail	0	0%	0%
Food Stores (food/liquor)	2	5%	2%
Warehouse (Refrigerated and Un-refrig)	3	8%	4%
Schools	4	10%	5%
Colleges	4	10%	5%
Hospitals (health care)	2	5%	2%
Lodging (hotels)	6	15%	7%
Misc	10	26%	12%
<i>Total Commercial</i>	<i>39</i>	<i>100%</i>	<i>47%</i>
Industrial			
Manufacturing	21	91%	25%
Construction	0	0%	0%
Mining & Extraction	2	9%	2%
<i>Total Industrial</i>	<i>23</i>	<i>100%</i>	<i>27%</i>
Agriculture	3	100%	4%
TCU	14	100%	17%

In addition, a screener was developed to minimize the number of interviews with firms that probably have little or no interest in distributed generation. Most distributed generation systems require a minimum amount of electricity consumption to be practical. This minimum cutoff varies across technology. Almost all of the Level 3 systems on the SelfGen Incentive Program applications were above 50 kW. Assuming a capacity factor of 0.8 and 2000 hours of operation per year, a system of that size would supply 80,000 kWh of electricity per year. Therefore, it is likely that firms consuming less than 80,000 kWh of electricity per year would not be interested in distributed generation. However, to avoid potentially screening out too many businesses, a minimum cutoff equal to the typical yearly output of a 30 kW photovoltaic system (the minimum eligible size for a photovoltaic system under the SelfGen Incentive Program), which is about 52,000 kWh (assuming a capacity factor of 0.2 and 8760 hours of operation), was chosen.

Based on the 52,000 kWh minimum cutoff, the minimum number of employees needed to consume 52,000 kWh per year for a typical firm within each business type⁸ was estimated. This was done for two reasons: 1) respondents are more likely to know the number of employees within their firm than its annual electricity consumption, and 2) the sample available to Flagship Research included the number of employees, so Flagship could screen out businesses below the minimum cutoff without wasting interview time.

Table 3-4 presents the final sample design for the nonparticipant survey. The sample is stratified by *electric* service territory and building type. SoCalGas customers are included in the LADWP and SCE electric service territory strata.

⁸ To yield the number of employees needed to consume 52,000 kWh per year, 52,000 kWh was divided by the annual per-employee electricity consumption for each building type. The per-employee consumption data were obtained from EPRI's 1998 "Energy Market Profiles."

Table 3-4: Nonparticipant Survey Sample Design

	LADWP	SDG&E	PG&E	SCE	All
Commercial	17	38	55	67	177
Industrial	8	9	32	33	82
Agriculture	1	1	6	6	14
TCU	3	6	9	9	27
All	29	54	102	115	300
	10%	18%	34%	38%	100%
Commercial					
Office	2	4	7	8	21
Restaurant	1	1	2	3	7
Retail	1	2	3	4	10
Food Stores (food/liquor)	2	3	8	7	20
Warehouse (Refrigerated/Un-refrig)	2	2	7	6	17
Schools	2	5	7	10	24
Colleges	2	6	6	8	22
Hospitals (health care)	2	4	7	6	19
Lodging (hotels)	2	9	5	11	27
Misc	1	2	3	4	10
Total	17	38	55	67	177
Industrial					
Manufacturing	6	5	27	28	66
Construction	1	2	2	3	8
Mining & Extraction	1	2	3	2	8
Total	8	9	32	33	82
Agriculture					
Agriculture and pumping	1	1	6	6	14
Total	1	1	6	6	14
TCU					
Wastewater treatment ⁹	2	3	5	4	14
Other TCU	1	3	4	5	13
Total	3	6	9	9	27

⁹ Wastewater treatment facilities were given their own category because there was a relatively large number in the SelfGen Incentive Program.

Survey Instrument Design

The primary focus of the nonparticipant survey is to determine the awareness of and potential interest in distributed generation and the SelfGen Incentive Program. In addition, the survey shows how awareness and interest differ across business types. The results from the survey can potentially help the marketing strategy for the SelfGen Incentive Program and other related programs. The results specifically address Evaluation Criteria G1A, G7A, and G8A.

The main topic areas covered by the nonparticipant survey include the following:

- Awareness of distributed generation and the SelfGen Incentive Program,
- Experience with distributed generation, and
- Potential interest in distributed generation.

The nonparticipant survey was developed by the project team, with input from the Working Group. Appendix D contains the final survey instrument.

Survey Implementation

Flagship Research purchased a sample of randomly selected businesses for each stratum from a commercial firm that provides business contact lists. The business listing firm matched each randomly selected business to a stratum using the business' ZIP code (which mapped the business to a specific electric service territory) and four-digit SIC code (which mapped the business to a specific business type category). Flagship administered the surveys using a CATI (computer-assisted telephone interview) system. A four callback protocol was used to conduct the survey. Once a stratum's target was met, Flagship stopped calling businesses from that stratum. Flagship provided the final dataset containing 300 observations to RER in an Excel file.

Completed Sample

The completed sample is identical to the sample design presented in Table 3-4.

Nonparticipant Survey Weights

Each stratum of nonparticipant survey respondents was assigned a relative weight based on the electricity consumption of that stratum (i.e., business type and electric service territory), relative to the total electricity consumption across all strata. For example, Table 3-2 shows that offices in the PG&E electrical service territory consume 7,072 GWh annually. This is 4% of the total electricity consumed across all business types and service territories in Table 3-2.¹⁰ Therefore, the PG&E office respondents receive a collective weight of 0.04. Respondents *within* a stratum were each weighted equally. To continue the example, since

¹⁰ The total GW-Hrs is 161,311.

there were seven respondents from the PG&E office stratum, each of these respondents has a relative weight of 0.04/7. These relative weights are used when analyzing results across nonparticipant strata in the subsequent sections of this report.

3.6 Supplier Surveys

In-depth telephone surveys and face-to-face interviews were conducted with suppliers involved in the 2001 SelfGen Incentive Program. The suppliers generally fell into one of the following categories.

- **Third Party Applicants.** Third party applicants are energy service companies (ESCOs), other energy consultants, and integrators who serve as applicants to the program for one or more host customers.
- **Manufacturers.** Manufacturers are firms that manufacture distributed generation equipment installed under the 2001 applications.

Table 3-5 shows the population of third party applicants in 2001 stratified by technology type and number of 2001 program applications, along with the number of targeted and completed surveys for each stratum. The project team determined the target sample size based on available project budget and schedule. The agreed upon completed sample size was 28, which is roughly half the population. A sample allocation strategy was developed that ensured that all technologies and service territories were adequately represented (many of the larger applicants had applications in multiple service territories). In addition, third parties with multiple applications were more heavily sampled than firms with only one application, since they have more experience with the program.

Table 3-6 shows the population of manufacturers represented in the 2001 SelfGen Incentive Program applications stratified by technology type and number of applications using a particular manufacturer. This is accompanied by the number of targeted and completed surveys for each stratum. Available budget determined the target sample size for the manufacturers, which was roughly 25% of the population. As the table indicates, manufacturers were grouped into four categories corresponding to the number of proposed installations of that manufacturer's equipment under the SelfGen Incentive Program. The sample allocation essentially targeted one interview for each technology in each installation category. Since about half of the manufacturers were represented in more than one Program Administrator's service territory, each service territory was adequately represented without requiring the sample to be stratified by Program Administrator.

Survey Instrument Design

The primary focus of the supplier interviews was to provide information to support the process evaluation, and address issues relating to Evaluation Criteria G4A, G6A, and G6C. The major topics covered by the survey include the following:

- Program design (e.g., the adequacy of the 90-day and one-year deadlines),
- Typical project development process, and the effects of the SelfGen Incentive Program on this process, and
- Impact of the SelfGen Incentive Program on the supplier’s business.

Survey instruments tailored for third party and manufacturer respondents for the supplier survey were developed with input from the Working Group. Appendix C contains the final version of the survey instrument.

Survey Implementation

Most third party and manufacturer surveys were completed by senior research staff via telephone. In addition, several surveys with third party applicants and manufacturers heavily represented in the program were completed in person.

Completed Sample Size

A summary of the number of completed third party and manufacturer surveys are included in Table 3-5 and Table 3-6, respectively.

Supplier Survey Weights

Expansion weights were developed separately for third party applicants and manufacturers. Firms that served both roles—i.e., as third party applicants and manufacturers—were treated as third party applicants, since third party applicants are generally more involved with the program.

Each third party applicant respondent received an *adjusted expansion weight* equal to a *raw expansion weight* times a *stratum adjustment*. The raw expansion weight equals the population of the stratum divided by the number of respondents in the stratum. For example, since the photovoltaic “2 to 8 applications” stratum had a population of nine and a completed sample of five, each of the five respondents received a raw expansion weight of 9/5. Thus, the raw expansion weight is very similar to the weights used for host customers. Moreover, each third party applicant stratum received a *stratum adjustment* to account for the stratum’s share of all applications submitted by third party applicants for that technology. This stratum adjustment equals the stratum’s share of applications for that technology, divided by the stratum’s share of firms for the technology. For example, since the photovoltaic “2 to 8

applications” stratum accounted for 9/17 of all PV firms (from Table 3-5) and 35% of all photovoltaic applications submitted by third party applicants, this stratum’s adjustment factor is $(0.35)/(9/17) = 0.66$. Finally, a respondent’s adjusted expansion weight equals the raw expansion weight times the stratum adjustment. Therefore, each respondent in the photovoltaic “2 to 8 applications” stratum receives an adjusted expansion weight of $(9/5)*(0.66) = 1.19$. The sum of the adjusted expansion weights across all third party respondents equals the population of third party applicants (55).

Each manufacturer respondent received a relative weight equal to its proportion of the sampled firms’ applications for that technology times the proportion of all 2001 projects that used that technology. For example, two surveyed photovoltaic manufacturers did not serve as third party applicants, call them Firm A and Firm B.¹¹ Firm A’s generating equipment was used on 12 projects, and Firm B’s equipment was used on 14 projects. Therefore, the total of the sampled photovoltaic firms’ applications is 26. The population of photovoltaic projects in 2001 was 86, which represents 33% of the total population of projects. Firm A’s relative weight is $(12 / 26)*(0.33) = .15$, and Firm B’s relative weight is $(14 / 26)*(0.33) = 0.18$. The sum of these weights within a particular technology equals the proportion of all 2001 projects that used the technology.

¹¹ The two other surveyed PV manufacturers were also third party applicants, so they were counted as third party applicants instead of manufacturers.

Table 3-5: Third Party Applicants

# of 2001 Applications	Photovoltaic			Fuel Cell			Microturbine			Internal Combustion Engine			All Technologies		
	Popu- lation	Target Inter- views	Completed Interviews	Popu- lation	Target Inter- views	Completed Interviews	Popu- lation	Target Inter- views	Completed Interviews	Popu- lation	Target Inter- views	Completed Interviews	Popu- lation	Target Inter- views	Completed Interviews
>8	2	2	2	0	0	0	0	0	0	1	1	1	3	3	3
2 to 8	9	5	5	1	1	1	2	2	2	16	7	8	28	15	16
only 1	6	2	2	1	1	1	8	3	3	9	4	3	24	10	9
Total	17	9	9	2	2	2	10	5	5	26	12	12	55	28	28

Table 3-6: Manufacturers Represented in SelfGen projects

# of 2001 Applications	Photovoltaic			Fuel Cell			Microturbine			Internal Combustion Engine			All Technologies		
	Popu- lation	Target Inter- views	Completed Interviews	Popu- lation	Target Inter- views	Completed Interviews	Popu- lation	Target Inter- views	Completed Interviews	Popu- lation	Target Inter- views	Completed Interviews	Popu- lation	Target Inter- views	Completed Interviews
>19	1	1	1	0	0	0	1	1	1	2	1	2	4	3	4
10 to 19	3	1	2	0	0	0	0	0	0	3	1	2	6	2	4
2 to 9	4	1	0	1	1	1	3	1	1	7	1	1	15	4	3
1	4	0	1	2	1	0	4	0	0	5	0	1	15	1	2
Total	12	3	4	3	2	1	8	2	2	17	3	6	40	10	13

4

Program Status and Participant Characterization

4.1 Overview

This section summarizes all projects submitted to the CPUC Self-Generation Incentive Program (SelfGen Incentive Program) in 2001, based on data available as of the first quarter 2002 (March 2002). It also includes a characterization of all program participants, and suggests modifications to the Program Administrator tracking data to improve future evaluations.

Program participants include several types of stakeholders involved with a typical self-generation project. While the level of involvement for each stakeholder varies by project, they are referred to collectively as “participants.” These participants include the following:

- **Host customers:** Owners or operators of the facility where the generating system will be installed.
- **Energy service companies (ESCOs):** Firms that typically own the generating system and charge the host customer for the electricity (and thermal energy, for Level 2 and 3 projects) produced.
- **Energy consultants, contractors, and system integrators:** Firms that perform tasks ranging from feasibility studies to turnkey installation and operation.
- **Manufacturers and distributors of distributed generation equipment:** Manufacturers and distributors of photovoltaic modules, wind turbines, fuel cells, microturbines, small gas turbines, and internal combustion engines installed under the SelfGen Incentive Program.

Each of these four types of participants served as applicants to the program in 2001. There is some overlap between the latter three types. For example, some firms manufacture distributed generation equipment and provide turnkey installation services. Any party *other than the host customer* that serves as the applicant for a SelfGen Incentive Program project is referred to as a third party applicant. Approximately 75% of the 2001 self-generation projects used third party applicants.

One focus of the first year evaluation is to characterize the self-generation projects and the participants involved with those projects. There are several reasons for doing this. First, it helps identify those host customer types that tend to benefit from distributed generation.

Second, analyzing host customer and supplier characteristics associated with slow or unsuccessful projects could suggest potential improvements in program design, if those types of projects are generally successful outside of the SelfGen Incentive Program. Finally, understanding the roles of the various suppliers helps the evaluators better assess the performance of the program relative to Evaluation Criteria G6.A (“Quantifiable Program impact on market development needs of the energy services industry”). In addition, supplier characterization can aid in program design. For example, understanding the lead times that contractors face can help establish the correct deadline/milestone schedule.

Section 4.2 begins with an overview of the status of all self-generation projects whose applications (i.e., Reservation Request Forms) were received in 2001. Then, the distributed generation systems associated with these projects are characterized. Section 4.2 also includes a discussion of the relative contribution of the program and the participants to the cost of the distributed generation systems. The data used for Section 4.2 come from the electronic tracking data provided by the Program Administrators (Program Administrator tracking data).

Section 4.3 characterizes the host customers involved with the 2001 projects. It includes information about the types of firms and organizations comprising the host customers, as well as characteristics of those organizations. The host customer surveys and Program Administrator tracking data were the sources for this section.

Section 4.4 characterizes the third party applicants and manufacturers (collectively referred to as “suppliers”) involved with the 2001 projects. It includes information about the types of suppliers involved with the program and the characteristics of those suppliers. The supply channel surveys and Program Administrator tracking data were the sources for this section.

Section 4.5 includes a discussion of the Program Administrator tracking data. It includes recommended additions and changes to the Program Administrator tracking data that could improve participant characterization efforts in the future. Section 4.5 also includes a suggested schedule for data updates.

Section 4.6 summarizes the results of Section 4.

4.2 Summary of 2001 Projects

The 2001 SelfGen Incentive Program received 262 requests for funding (in the form of a Reservation Request Form) in 2001. These requests are referred to as the 2001 projects. The host customers and suppliers associated with these projects are referred to as the 2001 host customers and suppliers. The application status of each 2001 project changes regularly. For this report, the stage and status of these projects are developed using the latest available data

(from March 2002).¹ Further, all 2001 projects are placed into two categories: active or inactive.

- **Active Projects.** Active projects refer to projects that are proceeding with the application process. The milestones they had passed as of March 2002 categorize active projects. These categories are as follows:
 - **Under Review.** This group of applicants include those projects whose Reservation Request Forms (the initial application form for the Program) are still being reviewed.
 - **Conditional Reservation.** Active projects that are classified as conditional reservation include those projects that had been issued a Conditional Reservation Notice letter.
 - **Confirmed Reservation.** This group includes those projects that had provided proof of project advancement and received a confirmed reservation.
- **Inactive Projects.** Inactive projects are defined as those projects that have either been withdrawn by their applicant or been rejected by a Program Administrator. Inactive projects are categorized by the initiator of the project’s cancellation (i.e., the Program Administrator or the applicant).
 - **Withdrawn.** The withdrawn category includes those projects that were cancelled by the applicant.
 - **Rejected.** The rejected category includes those projects that were cancelled by a Program Administrator.

The distinction between rejections and withdrawals is artificial in many cases, because a single project may be mutually cancelled by both the Program Administrator (because the project does not meet program requirements) and by the applicant (due to difficulties unrelated to the program). In addition, some applicants whose 2001 projects were withdrawn or rejected have re-applied (in 2001 or 2002), or plan to re-apply in 2002. Therefore, most of the discussion in this section refers to withdrawals and rejections collectively as “inactive” projects. Section 5 addresses the reasons behind these inactive projects.

Figure 4-1 presents the distribution of the number of 2001 projects by application status (active vs. inactive) and incentive level, based on the reported March 2002 data. About 60% of the 2001 projects were still active as of March.

Figure 4-2 presents the distribution of installed capacity of the 2001 projects by application status (active vs. inactive) and incentive level, based on March 2002 data. About 57% of the installed capacity of 2001 projects was still active as of March, accounting for 55,209 kW.²

¹ Section 4.5 includes a proposed schedule for providing tracking data updates, which would occur at every quarter.

² These figures differ slightly from those reported in the CPUC’s “July-December 2001 Status Report (updated April 24, 2002)” because of the timing of the data used.

Figure 4-1: Distribution of 2001 Projects by Application Status and Incentive Level

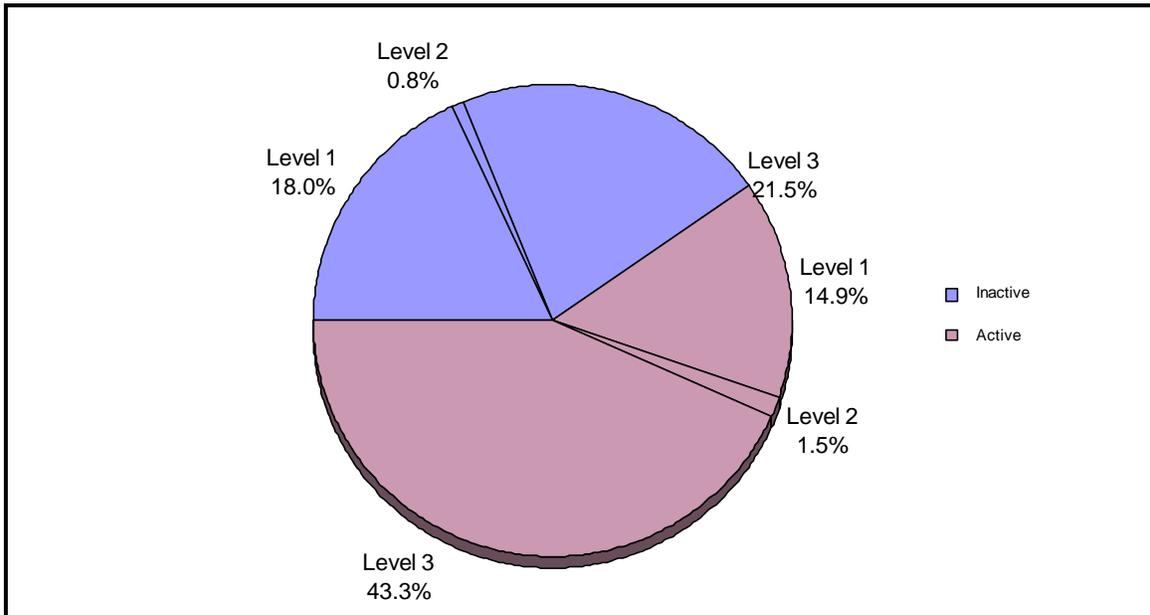
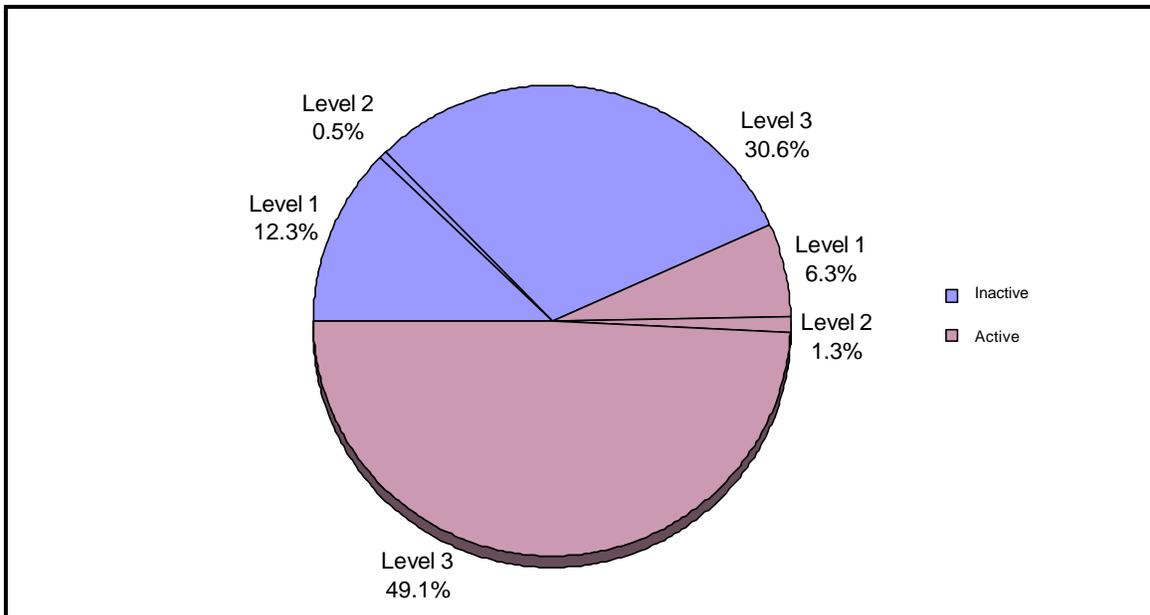


Figure 4-2: Distribution of Potential Installed kW Capacity of 2001 Projects by Application Status and Incentive Level



Active Projects

Table 4-1 presents the status of the 157 projects active at the end of the first quarter of 2002. Of the three incentive levels, Level 3 has the most projects (113), (potential) installed capacity (46,973 kW), and total potential incentives reserved (\$29.2 million).³ Incentive Level 1 accounts for far fewer projects (40) and installed capacity (7,036 kW) than Incentive Level 3, yet the potential incentives reserved for Incentive Level 1 (\$28.0 million) still account for a significant portion of the overall budget. Relative to incentive Levels 1 and 3, there has been very little activity in Incentive Level 2 to date. It only accounts for four projects—1,200 kW of installed capacity and \$2.9 million in potential reservations.

Due to the 90-day proof of project advancement requirement, most of the projects in the Under Review and Conditional Reservation categories should have either advanced to the Confirmed Reservation category by now or become inactive. Based on interviews with 2001 host customers and Program Administrators, however, a few of these projects have received extensions on the 90-day deadline. Their one-year deadline for completing the system is unchanged.

The statewide incentive budget of \$100 million was originally divided evenly across the three incentive levels. However, because of low activity in Incentive Level 2, some of the Program Administrators have shifted funding away from Incentive Level 2. In addition, the Program Administrators have moved funds from their administrative budgets into the incentive budgets, increasing the total incentive budget by nearly \$19 million. Based on the CPUC SelfGen Incentive Program *July – December 2001 Status Report* (updated April 24, 2002), the current statewide incentive budgets are as follows:

- Incentive Level 1: \$ 54.9 million
- Incentive Level 2: \$ 25.5 million
- Incentive Level 3: \$ 38.5 million
- TOTAL: \$118.9 million

Evaluation Criteria G1.B requires that the SelfGen Incentive Program be fully subscribed in order to meet the first goal of the program (“*Encourage the deployment of distributed generation in CA to reduce peak electrical demand*”). Incentive Level 3 comes closest to meeting this criterion with total potential reservations of \$29.2 million, which is close to the initial total Incentive Level 3 budget of \$33 million. Incentive Level 1 potential reservations total \$28 million, while Incentive Level 2 potential reservations are just under \$3 million. Each of these three incentive levels had an initial first-year budget of \$33 million.

³ “Potential incentives reserved” refers to the combined incentive amount of all active projects, i.e., conditional reservations, confirmed reservations, and “under review” projects.

Evaluation Criteria G3.A is similar to G1.B, except that it specifically requires the maximum of combined budget allocations for Incentive Level 1 and 2 technologies. As of March 2002, combined Incentive Level 1 and 2 potential 2001 reservations totaled just under \$31 million, considerably less than either the initial combined Incentive Level 1 and 2 budget allocations of \$66 million or the revised combined Incentive Level 1 and 2 allocations of \$80.4 million.

Table 4-1: Summary of Active 2001 Projects

	2001 Incentive Budget (\$ millions)	Active Projects as of March 2002 (for all Administrators)											
		Reservation Request Form Under Review			Conditional Reservation			Confirmed Reservation			Total Active		
		Projects	KW	Incentives (\$)	Projects	kW	Incentives (\$)	Projects	kW	Incentives (\$)	Projects	kW	Incentives (\$)
Incentive Level 1	54.9	5	893	3,388,039	31	5,237	20,588,110	4	906	4,038,867	40	7,036	28,015,016
Incentive Level 2	25.5	0	0	0	2	800	2,000,000	2	400	871,180	4	1,200	2,871,180
Incentive Level 3	38.5	15	3,682	2,049,316	81	35,530	22,731,044	17	7,761	4,439,539	113	46,973	29,219,899
All Incentive Levels	118.9	20	4,575	5,437,355	114	41,567	45,319,154	23	9,067	9,349,586	157	55,209	60,106,096

All 2001 applicants in the Reservation Request Form Under Review and Conditional Reservation categories should have moved on to the confirmed reservation category by now, or into an inactive category (except for those who received a milestone deadline extension).

System Characteristics

All Program Administrator tracking data included information on the technology used and the project size (in kW). Most Program Administrators also provided the eligible cost for the projects. Table 4-2, Table 4-3, and Table 4-4 include the size, eligible cost, and eligible cost per watt of active projects, respectively.⁴

Table 4-2: Potential Installed Capacities for Active 2001 Projects

Technology/Fuel	System Size (kW)				
	N	Mean	Min	Median	Max
Photovoltaic	40	176	30	87	1,000
Fuel cell, Renewable Fuel	0				
Fuel cell, Non-Renewable Fuel	4	300	200	200	600
IC engine	82	512	60	400	1,000
Micro and Small Gas Turbines	31	161	28	100	1,000

Table 4-3: Eligible Cost of Active 2001 Projects

Technology/Fuel	Eligible Project Cost (\$)				
	N	Mean	Min	Median	Max
Photovoltaic	37	\$1,289,663	\$159,840	\$680,829	\$7,341,655
Fuel cell, Renewable Fuel	0				
Fuel cell, Non-Renewable Fuel	4	\$2,072,425	\$1,147,300	\$1,475,000	\$4,192,400
IC engine	52	\$1,059,609	\$150,000	\$812,990	\$3,925,000
Micro and Small Gas Turbines	19	\$457,892	\$79,850	\$210,000	\$2,100,454

Table 4-4: Eligible Cost per Watt of Active 2001 Projects

Technology/Fuel	Eligible Project Cost per Watt (\$/Watt)				
	N	Mean	Min	Median	Max
Photovoltaic	37	\$8.88	\$5.04	\$8.76	\$16.27
Fuel cell, Renewable Fuel	0				
Fuel cell, Non-Renewable Fuel	4	\$6.87	\$5.74	\$6.62	\$8.50
IC engine	52	\$2.24	\$1.20	\$2.06	\$4.13
Micro and Small Gas Turbines	19	\$3.14	\$1.60	\$3.16	\$5.20

⁴ Total cost and cost-per-watt were not available for all systems from the tracking data.

In terms of potential installed capacity (kW), internal combustion engine systems were the largest, followed by fuel cells, photovoltaic, and micro/small gas turbines. This ordering is similar if the median is used rather than the mean, except that the median micro/small gas turbine is larger than the median photovoltaic system. Internal combustion engine systems averaged about 512 kW and ranged from 60 kW to the program maximum 1,000 kW.⁵ Photovoltaic and microturbine projects tend to be roughly the same size, averaging 176 and 161 kW, respectively. The photovoltaic systems ranged from the program minimum of 30 kW to the program maximum of 1,000 kW. Microturbine and small gas systems ranged from 28 kW to the program maximum of 1,000 kW. Fuel cell systems averaged 300 kW and ranged in size from 200 kW to 600 kW.

In terms of eligible cost, all systems except microturbines are averaging more than \$1,000,000. Fuel cell projects were the most expensive, averaging just under \$2.1 million, followed by photovoltaic (\$1.3 million), internal combustion engines (\$1.1 million), and microturbines (\$0.5 million). There are multimillion dollar projects in each incentive level; the most expensive is a \$7.3 million photovoltaic project.

For both installed capacity and eligible cost, the mean is greater than the median for all technologies, indicating there are a few large systems for each technology that are pulling up the means.

Photovoltaic per-watt costs are clearly the highest of the technologies, followed by fuel cells, micro/small gas turbines, and internal combustion engines. This ordering is true whether the mean or the median is used.

Participant vs. Program Contribution

The incentive for a self-generation project is based on system size or installed cost, whichever results in a lower incentive.⁶ Table 4-5 presents the basis for the allocated incentive amounts for active projects. Most of the allocated incentives are based on cost, and this is true for each technology except fuel cells.

⁵ The CPUC Rulemaking R98-07-037 on the ALJ Ruling of December 2001 increased the size limit to 1.5 MW; however, the portion eligible for incentives was still capped at 1 MW.

⁶ Incentive Level 1 is \$4.50 per watt or 50% of cost; Incentive Level 2 is \$2.50 per watt or 40% of cost; and Incentive Level 3 is \$1.00 per watt or 30% of cost.

Table 4-5: Basis for Incentive for Active Projects

Technology	Incentive Based on Size	Incentive Based on Eligible Cost
Photovoltaic	8 (21%)	30 (79%)
Fuel Cell (non-renewable)	3 (75%)	1 (25%)
IC Engine	5 (6%)	76 (94%)
Microturbine	4 (13%)	27 (87%)
Total⁷	20 (13%)	134 (87%)

Table 4-6 presents the mean of the proportion of the total cost provided by the SelfGen Incentive Program, and the mean of the cost per watt provided by the program. It also includes the incentive amounts specified in the SelfGen Incentive Program design. Since most of the incentives are based on installed cost rather than capacity, the mean proportion of cost provided by the program is very close to the maximum allowable percentage at each incentive level.

Table 4-6: Participant vs. Program Contribution for Active Projects

Technology	Maximum Allowable Incentive per Watt	Average of Approved Incentives (\$/Watt)	Maximum allowable Percent of Eligible Cost	Average of Approved Incentives (Percent of Eligible Cost)
Photovoltaic	\$4.50	\$4.13 (N = 40)	50%	47% (N = 37)
Fuel Cell (Non-renewable)	\$2.50	\$2.34 (N = 4)	40%	34% (N = 4)
IC Engine	\$1.00	\$0.61 (N = 81)	30%	29% (N = 52)
Microturbine	\$1.00	\$0.84 (N = 31)	30%	29% (N = 19)

⁷ This total does not add to program total because of missing observations.

Inactive Projects

Table 4-7 presents the status of the 105 projects inactive at the end of the first quarter of 2002. Incentive Level 3 had the most inactive projects at 56. However, Incentive Level 1 was a close second with 47 inactive projects. Incentive Level 2 only had two inactive projects as of March.

Table 4-7: Summary of Inactive 2001 Projects

Inactive Applications as of March 2002						
Incentive Level	Withdrawn		Rejected		Total Inactive	
	Projects	kW	Projects	kW	Projects	kW
1	20	4,329	27	7,431	47	11,760
2	0	0	2	450	2	450
3	21	13,252	35	16,067	56	29,319
Total	41	17,581	64	23,948	105	41,529

Comparing active projects to inactive projects by incentive level reveals that Incentive Level 1 projects are much more likely to become inactive than Incentive Level 3 projects. While about one-third of all Incentive Level 3 projects became inactive, over half of all Incentive Level 1 projects became inactive.

The number of inactive projects that had received conditional reservations before becoming inactive is not available. In addition, both the incentive requested and amount reserved (for those that received conditional reservations) are unavailable for many of the inactive projects. Therefore, the incentive funds represented by the inactive projects cannot be reported.⁸ However, the average size of inactive projects was about 100 kW greater than the average size for active projects for both Incentive Levels 1 and 3. This suggests that the size of the inactive projects may be partially responsible for their cancellation.

4.3 Host Customer Characterization

This section characterizes the host customers using data from the Program Administrator tracking data and the host customer surveys. The following characteristics are examined:

- Building Type
- Number of Employees
- Monthly Electric Bill
- Square Footage
- Distributed Generation Systems by Sector
- Annual Peak Demand

⁸ The funds reserved for these inactive 2001 projects have been rolled over into the 2002 incentive budgets.

- Use of Distributed Generation System as Emergency Backup
- Level of Host Customer Involvement with the Project

Building Type

Almost every major building type category was represented among the surveyed host customers. Figure 4-3 presents the weighted distribution of the host customers across these building types, based on the host customer surveys conducted by RER.⁹ Manufacturing was the most well represented category, followed by transportation, communications, and utilities (TCU), multifamily residential, office, and miscellaneous commercial. Among active host customers, the distribution is very similar, except that the multifamily residential category is not as highly represented. Restaurant, retail, and construction categories were not represented at all in the survey sample and are therefore excluded from all figures.

Each building type in Figure 4-3 is included in the subsequent figures for consistency. In some of these figures, however, one or more building types have missing data. In these cases, the building types' data appear as a zero in the figure.

Number of Employees

Figure 4-4 presents the mean and median number of employees or occupants at the facility to be supplied by the self-generation system. For most building categories, the mean number of employees was well above 100, indicating that smaller firms are generally not in the market for self-generation-funded systems. Only warehouses and agriculture averaged fewer than 100 employees. Miscellaneous commercial customers had the highest mean, followed by hospitals and offices.¹⁰ Hospitals had the highest median, followed by colleges, lodging, and offices.

⁹ All host customer figures and tables in this section are weighted according to the host customer weighting scheme presented in Section 3.

¹⁰ The mean is considerably higher than the median for miscellaneous commercial due to one very large facility.

Figure 4-3: Number of Host Customers by Building Type

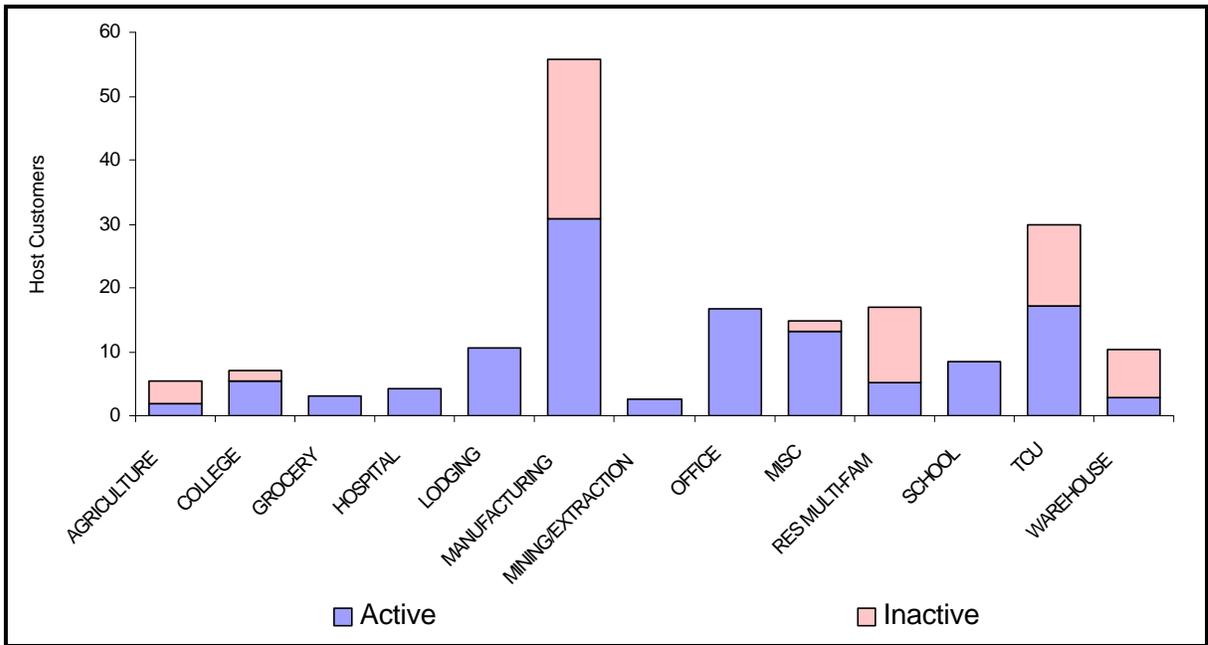
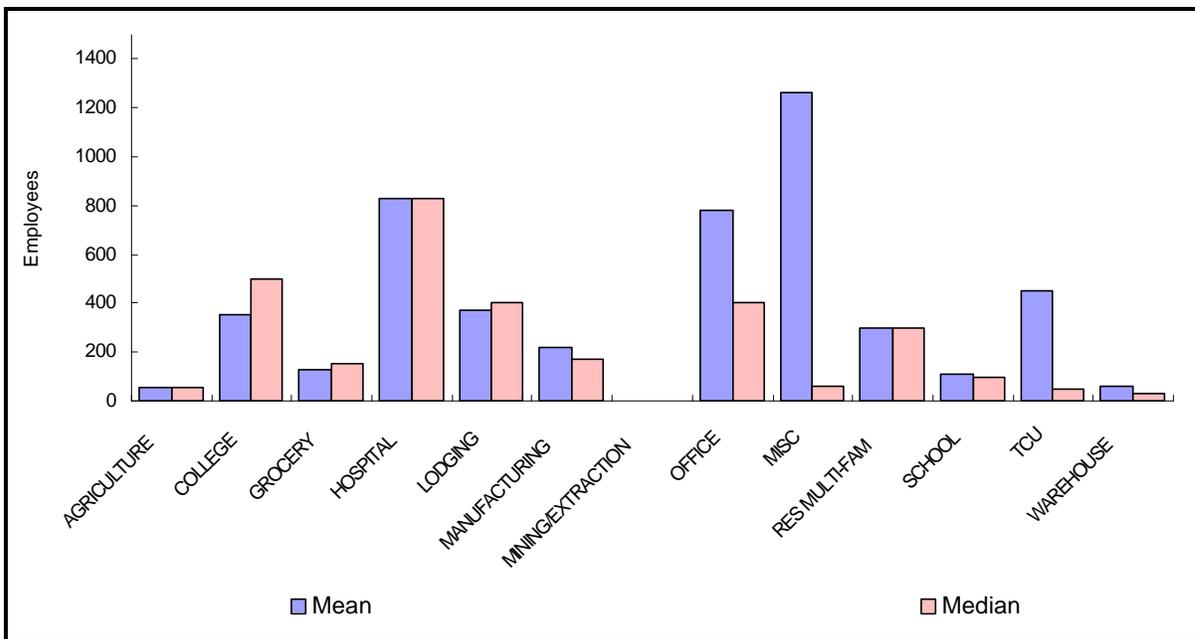


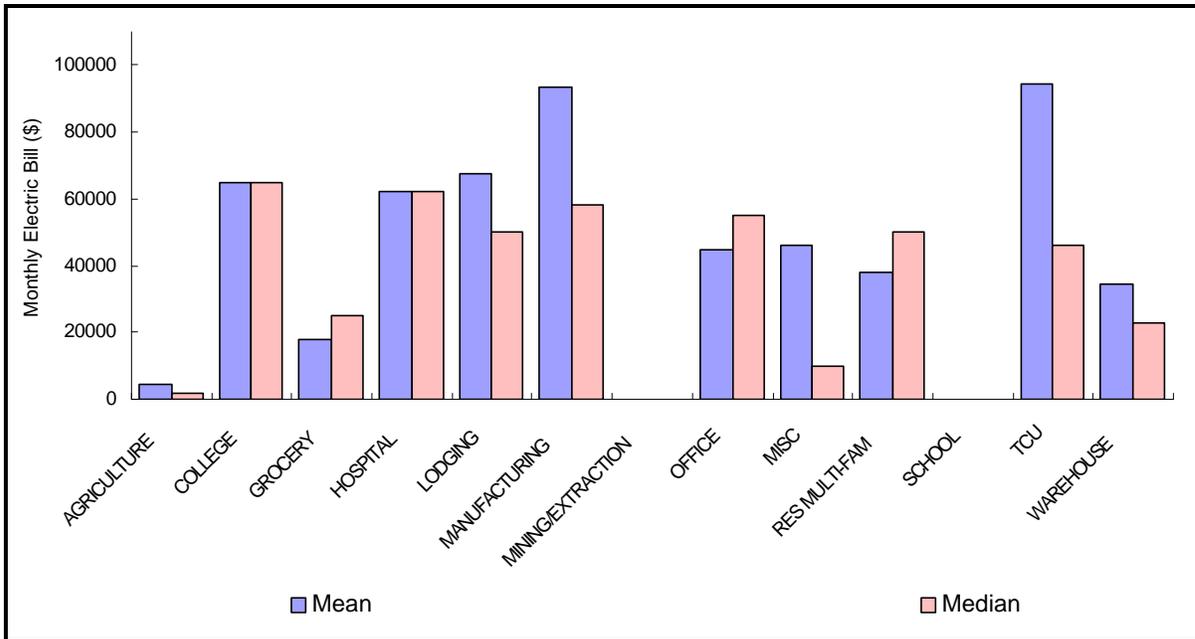
Figure 4-4: Average Number of Employees or Occupants at the Host Customer Facility



Monthly Electric Bill

Figure 4-5 presents the mean and median monthly electric utility bills for each building type. TCU had the highest mean electric bill, followed by manufacturing, lodging, colleges, and hospitals. Colleges had the highest median electric bill, followed by hospitals and manufacturing.

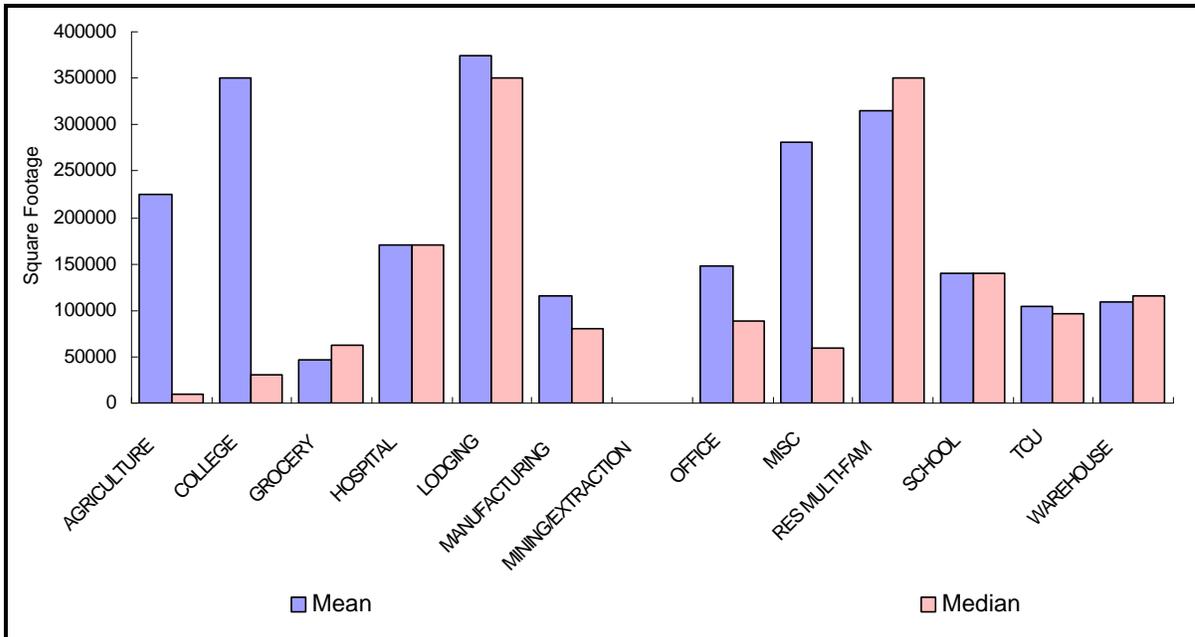
Figure 4-5: Average Monthly Electric Bill for Host Customers



Square Footage

Figure 4-6 presents the mean and median square footage for all host customers by building type. Lodging and colleges had the most mean square footage at about 350,000 square feet. However, the median square footage for colleges was considerably lower than its mean because of one very large facility. Lodging and multifamily residential had the highest median square footage.

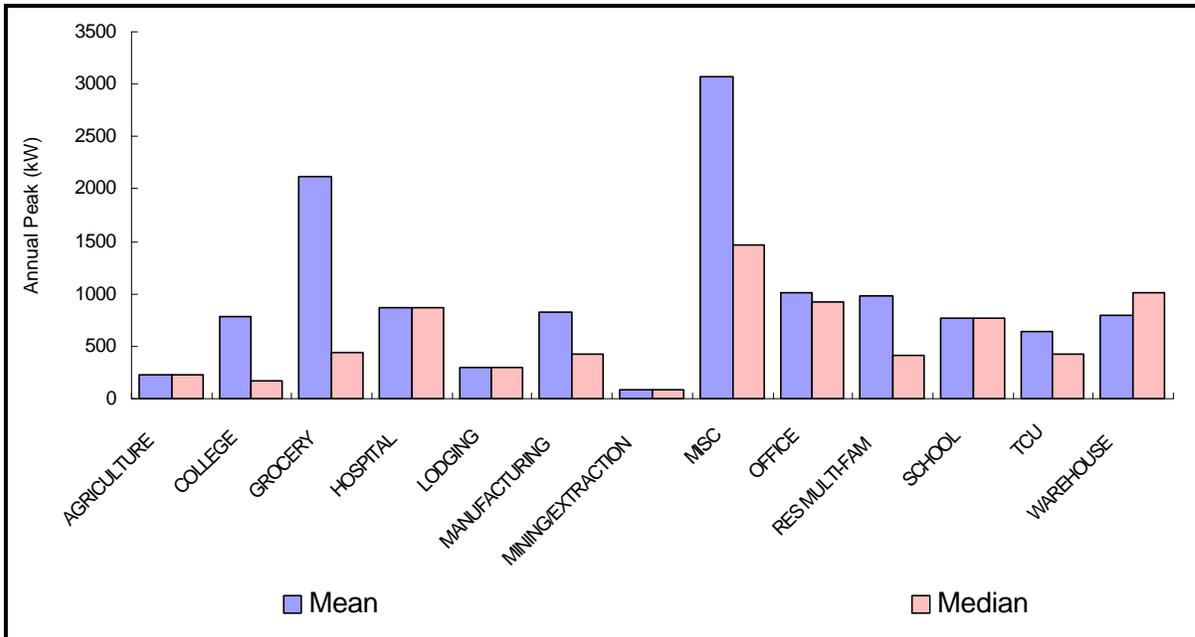
Figure 4-6: Average Square Footage for Host Customers



Annual Peak Demand

Figure 4-7 presents the mean and median annual peak demand for each building type. Miscellaneous commercial and grocery had the highest mean peak demand. However, the median peak demand was considerably less than the mean for each of those building types. The median peak demand was between 90 and 1,000 kW for all categories except miscellaneous commercial.

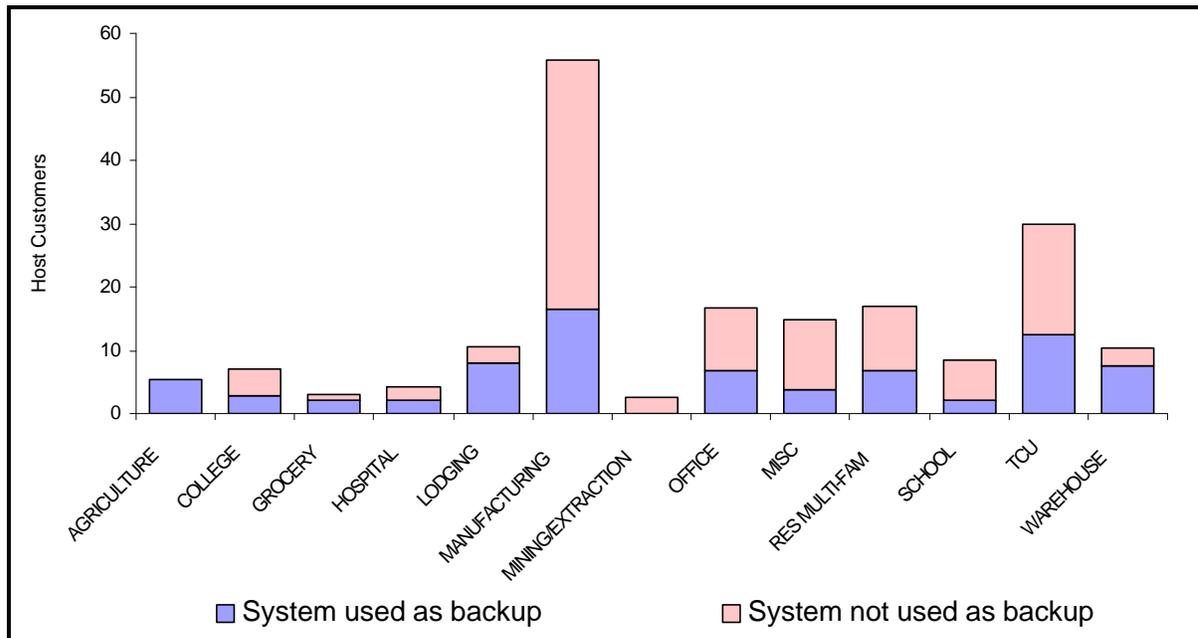
Figure 4-7: Average Annual Peak Demand for Host Customers



Use of Distributed Generation System as Emergency Backup

Figure 4-8 presents the percent of host customers whose self-generation systems will be available for emergency backup by building type. While self-generation systems may not be used *primarily* for emergency backup, many of the surveyed host customers were very sensitive to power outages and, therefore, designed their systems to operate when power from the grid is interrupted. Overall, 42% of the host customers planned to install hardware that would enable the self-generation system to provide emergency backup power.

Figure 4-8: Percent of Host Customers whose Distributed Generation System Provides Emergency Backup Power by Building Type



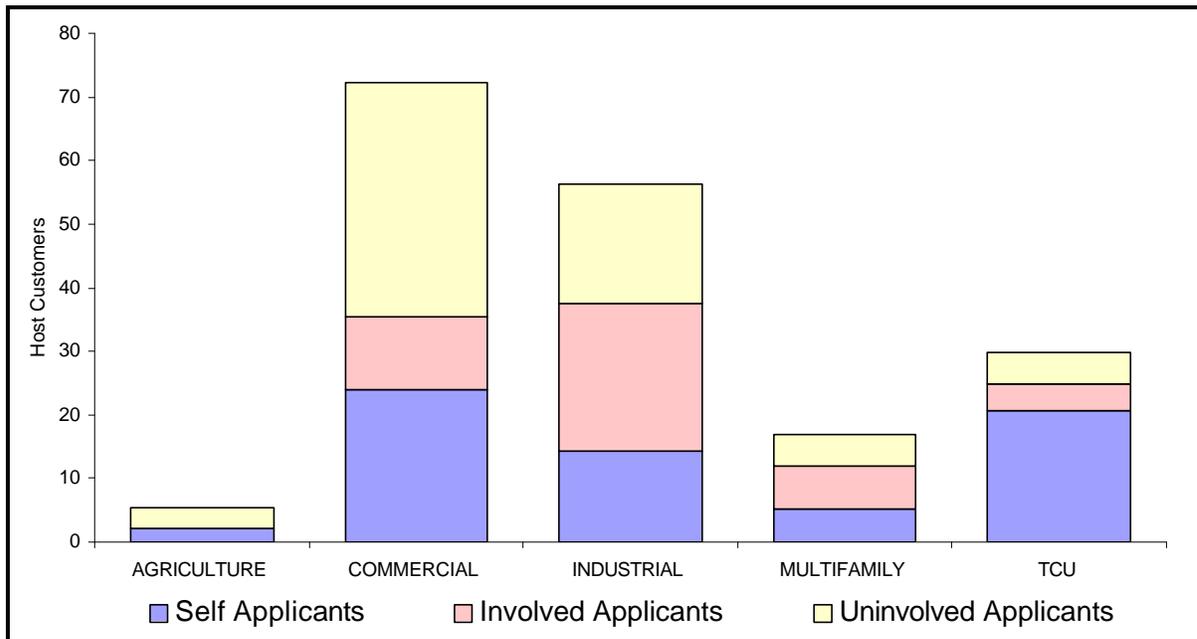
Level of Host Customer Involvement with the Project

Surveyed host customers were asked about their involvement with their self-generation project. They were divided into three groups based on their response.

- **Self Applicants:** those who are completing and submitting all the application forms themselves, and have direct contact with the Administrator.
- **Involved Applicants:** those who allow an energy service company, contractor, or some other party to complete and submit the application forms, but only after thorough consultation with the host customer.
- **Uninvolved Applicants:** those who allow an energy service company, contractor, or some other party to complete and submit the application forms, with minimal host customer involvement.

Figure 4-9 presents the involvement level of host customers by sector. The TCU sector had a higher percentage of self-applicants than the other sectors. The commercial, industrial, and multifamily residential sectors had similar distributions.

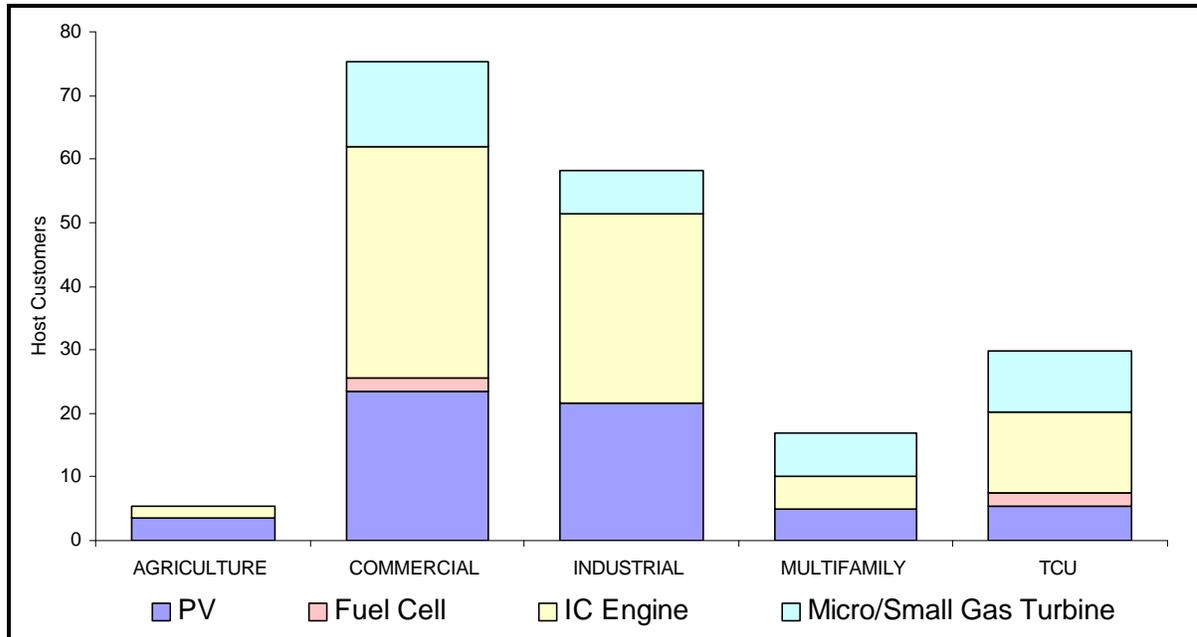
Figure 4-9: Host Customers’ Level of Involvement with Application Process by Sector



Distributed Generation Systems by Sector

Figure 4-10 presents the breakdown of technologies by sector for the host customers. Photovoltaic and internal combustion engine systems were present in every sector, and micro/small gas turbines were present in every sector except agriculture. Fuel cells were only present in the commercial and TCU sectors. Internal combustion engines were the most popular technology for each of the largest three sectors (commercial, industrial, and TCU).

Figure 4-10: Distributed Generation Technology Applications by Sector



4.4 Supplier Characterization

This section characterizes the 2001 SelfGen Incentive Program suppliers using data from the Program Administrator tracking data, third party applicant surveys, and manufacturer surveys. Based on their roles in the self-generation projects, suppliers are grouped into two categories.

- **Manufacturers.** Manufacturers of distributed generation systems that appeared on 2001 project applications; some also offer turnkey services.
- **Third Party Applicants.** ESCOs, turnkey integrators and installers, contractors, energy consultants, and related firms that served as applicants to the program for one or more host customers.

There is some overlap between these two groups since some firms provide multiple services (e.g., Capstone manufactures microturbines and provides turnkey installation). Overall, there

were 11 firms that served as both manufacturers and third party applicants (though they did not necessarily serve both roles for a given project). Seven of these 11 firms were included in the supplier surveys.

The following characteristics are examined for each of these two groups of suppliers:

- Level of activity in the program (or level of representation in the SelfGen Incentive Program, in the case of manufacturers),
- Firm size and age,
- Impact of SelfGen Incentive Program on the firm's business, and
- Typical role(s) performed by the firm in a distributed generation project.

Manufacturers

Level of Activity in Program

There were 40 manufacturers represented in the 2001 projects: ¹¹

- Twelve photovoltaic manufacturers,
- Three fuel cell manufacturers,
- Eight microturbine manufacturers, and
- Seventeen internal combustion engine manufacturers.

Table 4-8 presents the number of projects for the most heavily represented equipment manufacturers represented in the 2001 projects, based on the Program Administrator tracking data. Since the Program Administrator tracking data used for this table are confidential, the manufacturers are referred to anonymously. The photovoltaic and internal combustion engine markets each have a few major players, but microturbine projects were predominantly supplied by a single firm. Fuel cells were supplied primarily by one manufacturer.

¹¹ Some manufacturers produced equipment for multiple technologies. These firms were categorized according to the technology that appeared more often in the 2001 projects.

Table 4-8: Most Heavily Represented Equipment Manufacturers

Anonymous Name of Manufacturer	Number of 2001 projects
Photovoltaic	
A	27
B	14
C	12
D	12
Fuel Cells	
E	4
F	1
G	1
Microturbines	
H	34
I	4
J	3
IC engines	
K	33
L	21
M	15
N	12
O	11

Based upon the application tracking data, most primary generation equipment manufacturers were represented in five or fewer projects. However, for solar photovoltaic, internal combustion engines, and microturbines, there were a small number of manufacturers with heavy representation in the program.

Firm Size and Age

The project team sampled a small number of manufacturers whose equipment was represented in the program. Table 4-9 presents the number of full-time employees at the surveyed firms, as well as the weighted means and medians. Table 4-10 presents the age of the surveyed manufacturers.

Table 4-9: Full-Time Employees

Primary Technology of Manufacturer	Full-time employees				
	N	Mean	Min	Median	Max
Photovoltaic	1	120	120	120	120
Fuel Cell,	2	650	300	1000	1000
Micro and Small Gas Turbine	1	7	7	7	7
IC Engine	1	80	80	80	80

Table 4-10: Number of Years in Business

Primary Technology of Manufacturer	Years in Business				
	N	Mean	Min	Median	Max
Photovoltaic	2	26	25	25	27
Fuel Cell,	2	31.5	23	40	40
Micro and Small Gas Turbine	1	3	3	3	3
IC Engine	1	20	20	20	20

Impact of SelfGen Incentive Program

The supply channel survey included questions about 2000 and 2001 sales, along with the proportion of the 2001 sales due to the SelfGen Incentive Program. However, there was insufficient coverage of these data across manufacturers to draw any inferences about the impacts of the SelfGen Incentive Program on sales.

Distribution Channels and Lead Times

All surveyed manufacturers indicated that they ship the generating equipment directly to the host customer’s site, at least for systems as large as those installed under the SelfGen Incentive Program. The manufacturers were also asked the typical time that elapses between placing of an order and delivery to the installation site. The answers varied by technology, as follows:

- **Photovoltaics:** 4 to 12 weeks (two surveyed manufacturers)
- **Internal combustion engines:** 4 to 12 weeks (two surveyed manufacturers)
- **Microturbines:** 8 to 12 weeks (one surveyed manufacturer)
- **Fuel cells:** 4 to 6 months (two surveyed manufacturers)

Third Party Applicants

Level of Activity in Program

There were 55 third party applicants involved with the 2001 projects:

- Seventeen were primarily photovoltaic applicants,
- Two were primarily fuel cell applicants,
- Ten were primarily microturbine applicants, and
- Twenty-six were primarily internal combustion engine applicants.¹²

Table 4-11 presents the most active third party applicants for the 2001 projects, based on the Program Administrator tracking data. The firms are referred to anonymously because the Program Administrator tracking data is confidential. The internal combustion engine and photovoltaic projects were each dominated by a single firm. There was no clear leader for microturbines or fuel cells.

¹² Some third party applicants were involved with multiple technologies. These firms were categorized according to their primary technology.

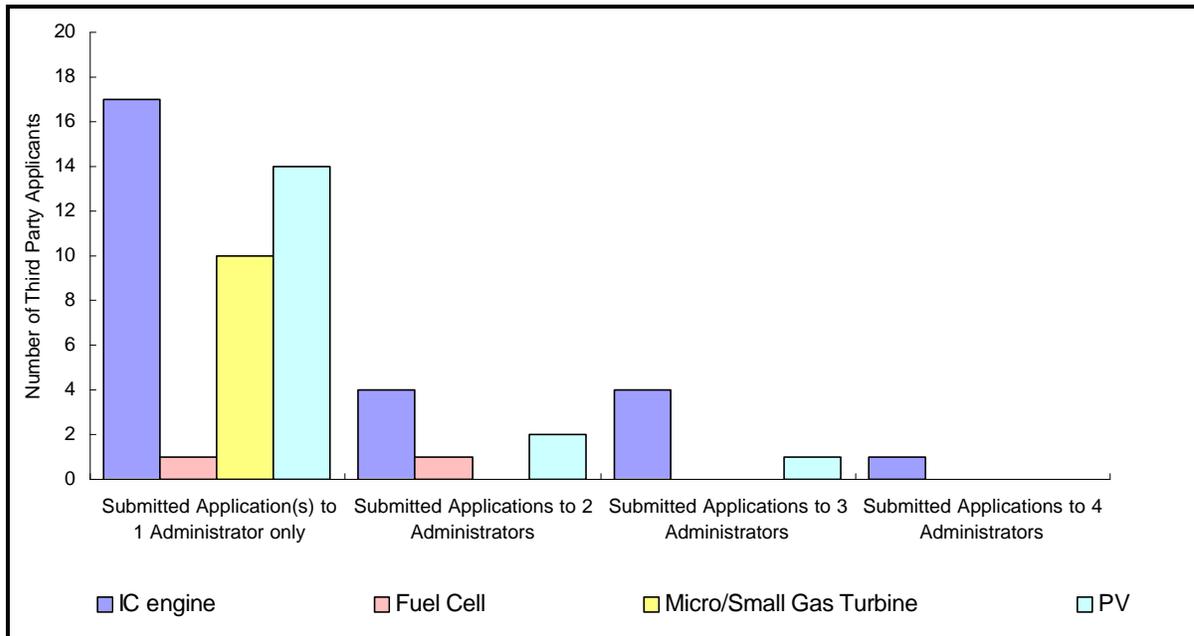
Table 4-11: Third Party Applicants

Anonymous Name of Third Party Applicant	Number of 2001 projects
Fuel Cells	
A	2
B	1
Internal Combustion Engines	
C	19
D	8
E	8
F	6
G	6
H	6
Microturbines	
I	3
J	2
Photovoltaic	
K	30
L	9
M	4

Note that for photovoltaic and internal combustion engines, there were quite a few firms involved with multiple projects. This was less true of fuel cell and microturbine third party firms.

While most third party applicants were only involved with projects in one service territory, some spanned multiple service territories. Figure 4-11 presents the number of third party applicants who submitted applications to multiple Program Administrators. Thirteen of the 55 third party applicants submitted applications to more than one Program Administrator.

Figure 4-11: Scope of Third Party Application Activity by Primary Technology



Firm Size and Age

Table 4-12 summarizes the number of employees of the surveyed third party applicants, and Table 4-13 summarizes the age of the surveyed third party applicants. There are not enough observations to generalize about the relative sizes or ages of third party applicants across technologies. These are intended merely to provide a glimpse at some of the third party applicants involved with the program.

Table 4-12: Full-time Employees

Primary Technology of Third Party Applicant	Full-time employees				
	N	Mean	Min	Median	Max
Photovoltaic	5	32	7	27	80
Fuel Cell,	1	4	4	4	4
Micro and Small Gas Turbine	2	129	7	129	250
IC Engine	9	61	3	40	200

Table 4-13: Number of Years in Business

Primary Technology of Third Party Applicant	Years in Business				
	N	Mean	Min	Median	Max
Photovoltaic	5	15	4	20	26
Fuel Cell,	1	5	5	5	5
Micro and Small Gas Turbine	4	44	1	14	100
IC Engine	10	10	1	2	100

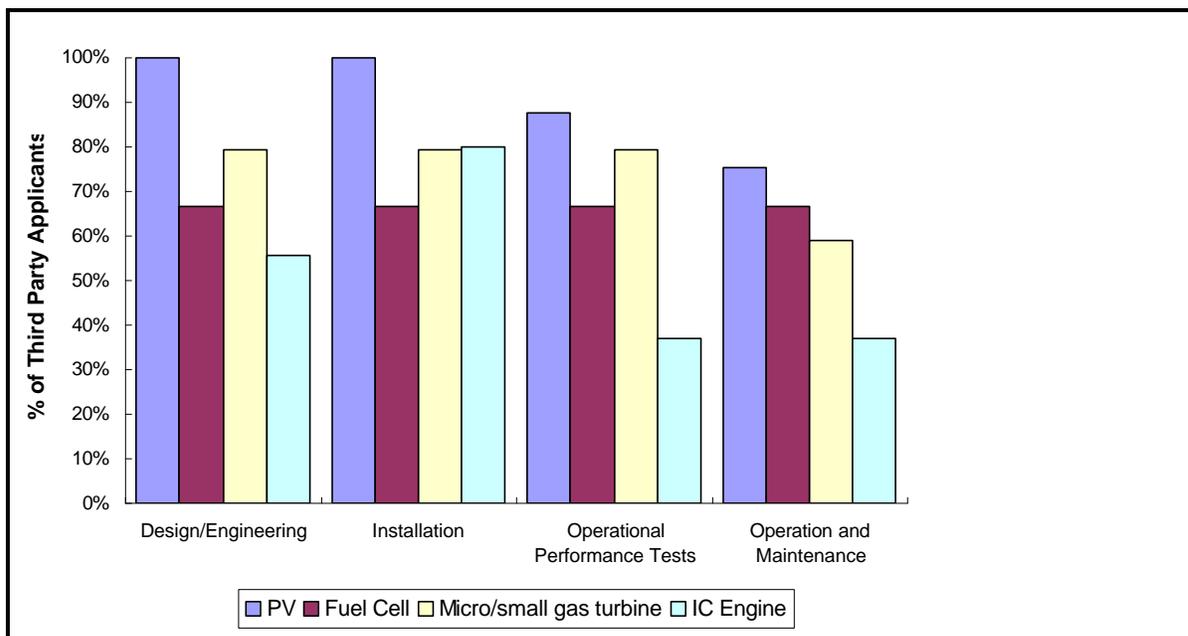
Impact of SelfGen Incentive Program

The supply channel survey included questions about 2000 and 2001 sales, along with the proportion of the 2001 sales due to the SelfGen Incentive Program. However, there was insufficient coverage of these data across third party applicants to draw any inferences about the impacts of the SelfGen Incentive Program on sales.

Typical Role(s) Performed in a Distributed Generation Project

Figure 4-12 presents the distribution of typical roles performed by the surveyed third party applicants. While there are not enough observations to make comparisons across technologies, the figure indicates that, in general, more firms are involved with design/engineering and installation than with operational performance tests and maintenance.

Figure 4-12: Distribution of Typical Roles Performed by Third Party Applicants



4.5 Program Administrator Tracking Data Review and Recommendations

As described in Section 3, each Program Administrator currently has its own tracking system for their self-generation projects. “Tracking system” refers to the set of tools used by the Program Administrators to track their projects. These tools typically include both hardcopy files and electronic data.¹³ While the primary purpose of these tracking systems is to help each Program Administrator efficiently manage a large number of projects, they also support the following tasks:

- Summary of the program’s status,
- Check for duplicate projects with other incentive programs,
- Process evaluation (e.g., tracking time required to meet certain milestones), and
- Characterization of the host customers installing self-generation systems

As part of the first year evaluation, each Program Administrator provided RER with either (1) the entire electronic database used to track their projects, or (2) reports from this electronic database. The data are referred to as the Program Administrator tracking data.

Program Administrators also submit tracking data to a web-based statewide tracking system called the compliance database. The primary purpose of the compliance database is to check for duplication with other programs, such as the CEC’s Buydown Program. The compliance database is maintained by a contractor to SoCalGas, and should not be confused with the Program Administrator tracking data kept by RER. The latest version of the compliance database available to the project team is from December 2001. The project team was unable to obtain a more recent version.

The following sections describe the current content of the Program Administrator tracking data and compliance database, suggest additional variables for future versions of the Program Administrator tracking data, and suggest a schedule for quarterly updates to the Program Administrator tracking data.

Current Content of the Administrator Tracking and Compliance Data

The content of the Program Administrator tracking data varied by Program Administrator, but the following items were consistently provided by *all* Program Administrators:

- Applicant name,
- Host name,
- System capacity (kW),

¹³ The electronic data format varies by Program Administrator. Formats include Excel spreadsheets, Access databases, and web-based databases.

- Incentive amount (\$),¹⁴
- Technology used,
- Manufacturer,
- Incentive level, and
- Status of project.

The content of the statewide compliance database is similar. It contains the following information:

- Host name,
- Host address,
- Host taxpayer ID,
- Host utility account number,
- System capacity (kW),
- Incentive requested (\$),
- Technology used,
- Incentive level,
- Status of project, and
- Date the Reservation Request Form was received.

Recommended Changes and Additions to the Program Administrator Tracking Data

Each Program Administrator has devoted considerable resources to their project tracking systems. Each tracking system was designed to aid in the administration of the SelfGen Incentive Program, and they all serve that purpose very well. Unlike the Program Administrators, however, outside evaluators do not have direct day-to-day knowledge of each project; the only project-level details available to those parties are in the Program Administrator tracking data.

To efficiently track participants on a *statewide* basis, and to consistently characterize *all* projects and participants, RER proposes that the Program Administrators do the following:

- Standardize the variables used to report the status and stage of a project,
- Include additional variables in the Program Administrator tracking data, and
- Provide RER with quarterly updates of the Administrator Tracking Data.

The next two subsections include suggestions for accomplishing these two goals.

¹⁴ Some Program Administrators distinguished between “incentive requested” and “reservation granted,” while others provided a single variable.

Standardizing the Stage and Status of SelfGen Incentive Program Projects

To aggregate project data across Program Administrators, a standard categorization scheme is proposed for both the stage of the application (how far along they are in the process), and the status of the application (whether it is active, withdrawn, or rejected, each of which could be true at any stage). While there has been some correspondence among Program Administrators regarding the necessity of standardizing these variables, such a standardization was not in place as of the first quarter of 2002. Based on the design of the program, we would suggest classifying applications as follows:

STATUS

- Withdrawn: applications that have been cancelled by the applicant. For those that have re-applied, there would be a separate variable indicating that a new application has been submitted for this project.
- Rejected: applications that have been cancelled by the Program Administrator. For those that have re-applied, there would be a separate variable indicating that a new application has been submitted for this project.
- Active: applications that have not been withdrawn or rejected.

STAGE (applicant would be categorized according to the latest stage reached)

- Complete Reservation Request Form (including all supporting documentation) has been received from the applicant (i.e., the application is under review): “RRF received.”
- Conditional Reservation Letter has been sent to applicant (i.e., a conditional reservation has been issued): “CRN sent.”
- Complete Proof of Project Advancement Form (including all supporting documentation) has been received from applicant: “PPA received.”
- Reservation Confirmation and Incentive Claim Form has been sent to the applicant (i.e., the reservation has been confirmed): “RCICF sent.”
- Complete Reservation Confirmation and Incentive Claim Form (including all supporting documentation) has been received from the applicant (i.e., incentive has been claimed): “RCICF received.”
- On-site verification has been conducted: “On-site verification complete.”
- Incentive check has been issued: “Check issued.”

Additional Tracking Variables

RER has compiled a list of variables that would aid in future participant characterization efforts that either (a) are not currently provided by any Program Administrator, or (b) are currently provided by only some of the Program Administrators. Table 4-14 contains the list of these variables, along with a description of how it would help in the evaluation effort and where the variable could be obtained.

Most of these variables would primarily aid future process evaluations. For example, obtaining the NAICS code, annual peak, and monthly consumption for *every* host customer, along with the dates of completed milestones, would allow the project team to determine how host customer characteristics affect the speed of project implementation. Such an analysis could aid in future program design/redesign efforts. Most of these additional variables could be obtained directly from the Reservation Request Forms submitted by the applicants, through normal correspondence with the applicant, or from customer databases already kept by each utility.

Table 4-14: Suggested Additional Tracking Data Variables

Description of Variable	Why the Variable is Needed	Possible Source for the Variable
SIC or NAICS codes for all host customers	Provides a standard way of characterizing business types involved with the program; provides a verification of the building type obtained from surveys of host customers.	Customer account database kept by each utility; or the Reservation Request Form could include a field for this information.
Host customer address, contact person, and phone number	Location for field verification; contact information for surveys; also provides information about the geographic dispersal of third party applicants' projects.	Reservation Request Form
Dates for all of the following milestones: <ul style="list-style-type: none"> ■ Receipt of Reservation Request Form in its entirety, including all supporting documentation ■ Mailing of Conditional Reservation Notice Letter ■ Receipt of Proof of Project Advancement in its entirety, including all supporting documentation ■ Approval of Proof of Project Advancement ■ Receipt of Reservation Confirmation and Incentive Claim Form in its entirety, including all supporting documentation ■ On-site inspection(s) ■ Incentive payment 	Provides a way to track the typical time required for each stage of the project development process; this helps determine if project delays are correlated with certain business types or other project-level characteristics	Correspondence with the applicant
Date that a project is officially cancelled (withdrawn or rejected)	Provides a time-series of withdrawals and rejections	Correspondence with the applicant
Primary reason that a project is cancelled	Helps identify potential problems with program design	Correspondence with the applicant
Eligible installed cost for the generating system	Allows comparison to costs of projects not in the SelfGen Incentive Program, to determine if program incentives increase the cost of a project	Reservation Request Form and correspondence with applicant
Annual peak demand	Allows estimation of peak-demand impacts of self-generation projects not yet complete.	Customer account database kept by each utility
Basis of incentive (i.e., \$ per watt, or % of cost) ¹⁵	Helps evaluate the incentive structure	Reservation Request Form
Monthly electric consumption, in kWh and dollars	Allows estimation of the actual output of the self-generation system, for those systems not yet complete; helps characterize the host customers for process evaluation efforts.	Customer account database kept by each utility

¹⁵ This could be inferred from the incentive amount, capacity, and total cost variables; however, there would be less chance for error if the tracking data indicated the basis.

Proposed Schedule for Administrator Tracking Data Updates

RER proposes the following quarterly schedule for receiving Program Administrator tracking data updates from the Program Administrators:

- July 31, 2002 (including all applications received through June 30, 2002),
- October 31, 2002 (including all applications received through September 30, 2002),
- January 31, 2003 (including all applications received through December 31, 2002),
- And so on, through the term of the SelfGen Incentive Program.

It may be helpful to have the compliance database updates and Program Administrator tracking data updates coincide; however, the compliance database does not include (or require) all the items in Table 4-14.

4.6 Summary

Program Status

The SelfGen Incentive Program received funding requests for 262 projects in 2001.

- ***Sixty percent were still active at the end of the first quarter of 2002.*** There was more attrition with Incentive Level 1 than the other incentive levels. Only 46% of 2001 Incentive Level 1 projects were active at the end of the first quarter of 2001.
- ***Incentive Level 3 currently accounts for the most program activity, in terms of number of active projects (113), potential installed capacity (46,973 kW), and potential reserved incentives (\$29.2 million).*** Incentive Level 1 is a distant second in terms of active projects (40) and potential installed capacity (7,036 kW), but the potential reserved incentives for Incentive Level 1 (\$28.0 million) are close to those of Incentive Level 3. Incentive Level 2 only has four active projects, 1,200 kW in potential installed capacity, and \$2.9 million in potential reserved incentives.¹⁶
- ***Incentive Level 3 comes closest to satisfying Evaluation Criteria G1.B, which requires that the SelfGen Incentive Program incentive budgets be fully subscribed.*** Incentive Level 3's potential reserved incentives of \$29.2 million are close to the initial budget allocation of \$33 million for Incentive Level 3. Incentive Level 1 potential reservations are \$28.0 million,

¹⁶ These potential incentive reservation figures include a few projects that were under review at the end of the first quarter of 2002 (and thus had not yet received conditional reservations). Potential incentive funds of \$3.4 million, \$0, and \$2.0 million were under review for Incentive Level 1, 2, and 3, respectively.

while Incentive Level 2 reservations are just under \$3 million. Each of these incentive levels also had an initial budget of \$33 million.

- **Active projects in Incentive Levels 2 and 3 include all eligible technologies (fuel cells using nonrenewable fuel, internal combustion engines, small gas turbines, and microturbines); Active Level 1 projects only include photovoltaic systems.** Wind turbines and fuel cells that use renewable fuel are also eligible for Incentive Level 1 funding, but no active projects use wind turbines or fuel cells with renewable fuel.
- **Eighty-seven percent of all active projects' incentive calculations are based on system cost rather than system capacity.** As a result, the average proportion of eligible cost supplied by program funds is very close to the maximum allowable percentage for each incentive level.

Participant Characterization

Third party applicants, distributed generation equipment manufacturers, and host customers are the most visible stakeholders in the SelfGen Incentive Program. These stakeholders are referred to collectively as the participants. There are several reasons for characterizing the participants, as discussed in the overview. The following is a summary of the host customers, third party applicants, and distributed generation equipment manufacturers.

Host Customers

There were 192 unique host customers involved with the program in 2001. The following is a brief summary of these host customers.

- **The commercial sector was the most heavily represented sector among 2001 host customers.** This sector was followed by the industrial, TCU, multifamily residential, and agricultural sectors.
- **Manufacturing was the most heavily represented building type among 2001 host customers and dominated the industrial sector projects.** Commercial sector projects were spread evenly across several building types (offices, miscellaneous commercial, warehousing, schools, colleges, and lodging); no single building type dominated the commercial sector. TCU sector projects were concentrated on wastewater treatment plants. Multifamily residential projects consisted primarily of apartment and retirement complexes. Agricultural sector projects included both livestock and grain farms.
- **Manufacturing and TCU facilities had the highest monthly electric bills and were the two most well represented building types among 2001 host customers.** The relative size of the host customers was characterized using several other parameters in addition to monthly electric bills, including number of employees, square footage, and annual peak demand. No single building type was dominant across all these parameters.

- **Internal combustion engines were the most popular technology for the three most highly represented sectors (commercial, industrial, and TCU).** Photovoltaic, internal combustion engine, and micro/small gas turbine projects were each present in every host customer sector except agriculture. Fuel cells were only used in the commercial and TCU sectors. Less than half of all host customers plan to use their self-generation system for emergency backup.
- **About one-third of all host customers indicated that they complete and submit all the application forms themselves and have direct contact with the Program Administrator (referred to as self-applicants above).** The remaining host customers rely primarily on a third party to perform these tasks, with varying levels of involvement. The TCU sector had the highest percentage of self-applicants, with over two-thirds of the TCU host customers classifying themselves as self-applicants.

Third Party Applicants

Fifty-five different third party applicants accounted for about three-fourths of the 2001 SelfGen Incentive Program applications. These third party applicants consist primarily of ESCOs, energy consultants, and contractors. The following is a summary of the 2001 third party applicants.

- **Photovoltaic and internal combustion engine projects are dominated by a small number of third party applicants.** For each of those technologies, the leading third party applicant had more than twice the number of applications of its closest follower. The concentration in the fuel cell, microturbine, and small gas turbine markets is not as marked, due to the smaller number of projects for those technologies.
- **About 25% of the third party applicants sent reservation requests to more than one Program Administrator.** Third party applicants involved primarily with internal combustion engine projects were more likely to span multiple Program Administrators than third party applicants associated with other technologies.
- **Third party applicants were involved in multiple stages of project development, including design/engineering, installation, operational performance testing, and operation and maintenance.** More firms were involved with design/engineering and installation than with the latter two stages.

Manufacturers of Distributed Generation equipment

There were 40 manufacturers represented in the 2001 projects. The following is a summary of these manufacturers:

- **There was a clear manufacturing leader for each technology.** The leading manufacturers of photovoltaic modules, fuel cells, and microturbines each had at

least twice the number of projects as their closest competitors. This was not true for the internal combustion engine market, but the leading internal combustion engine manufacturer still had 1.5 times the number of projects of its closest follower.

- **Lead times for equipment shipments ranged from 4 weeks to 6 months, depending on the technology.** Photovoltaic module and internal combustion engine lead times ranged from 4 to 12 weeks; microturbine lead times ranged from 8 to 12 weeks; and fuel cell lead times ranged from 4 to 6 months.

Suggested Changes to Administrator Tracking Data

The summaries of program status and participant characterization relied heavily on data provided to RER by the Program Administrators. Each Program Administrator provided either (1) the entire electronic database used to track their projects, or (2) reports from this electronic database. These data are referred to as the Program Administrator tracking data. In order to support future program status and participant characterization efforts, as well as other evaluation efforts, the project team recommends the following modifications to the Program Administrator tracking data:

- **Standardize the variables used to report the status and stage of a project.** Providing an accurate statewide summary of program status requires that the Administrators use a standard classification system. Section 4.5 includes a suggested categorization scheme for the status and stage of self-generation projects.
- **Include additional variables to aid in participant characterization, survey efforts, and other evaluation tasks.** Table 4-14 includes a description of the suggested variables, along with the justification for providing them, and the source of each variable. Some of these additional variables would help with the second task mentioned in the overview, namely identifying characteristics of host customers that affect the speed of project implementation.
- **Provide RER with quarterly updates of the Program Administrator tracking data, according to the proposed schedule in Section 4.5.** It may be helpful to have the compliance database updates and Program Administrator tracking data updates coincide; however, the compliance database does not include (or require) all the items in the Program Administrator tracking data.

5

First Year Process Evaluation

5.1 Introduction

This section presents the first year process evaluation of the California Public Utilities Commission (CPUC) Self-Generation Incentive Program (SelfGen Incentive Program). The process evaluation includes a review and assessments of the program design and implementation. The relevant areas of assessment of the first operational year of the program include:

- Effectiveness of joint delivery implementation approach,
- Program operational efficiency issues,
- Program acceptance and satisfaction,
- Program awareness,
- Program marketing efforts,
- Barriers to program participation,
- Effectiveness of program design upon removing market barriers, and
- Effectiveness of program design upon leveraging market incentives.

As discussed previously, the energy and demand impacts associated with the program will be evaluated following the second program operational year, when sufficient generation/useful thermal energy data are available from completed projects.

The remainder of this section addresses each of the eight topical areas of this process assessment, as listed above.

5.2 Effectiveness of Joint Delivery Implementation Approach

The approach employed to implement the SelfGen Incentive Program was to establish separate administrators for each of the investor-owned utility (IOU) service areas (Pacific Gas & Electric Company (PG&E), Southern California Edison Company (SCE), Southern California Gas Company (SoCalGas), and San Diego Gas & Electric Company (SDG&E). In the case of the SDG&E service area, the CPUC selected the San Diego Regional Energy Office (SDREO) to administer the program for SDG&E as the sole non-utility administrator. (Although not a Program Administrator, SDG&E is actively involved in the statewide

working group.) These four Program Administrators, along with representatives from the CPUC and the California Energy Commission (CEC), formed a statewide working group to jointly coordinate the SelfGen Incentive Program design, planning, measurement, verification, evaluation, and implementation efforts.

Assessment of the selected joint-delivery approach considers information provided by the Program Administrators, host customer program applicants, third party and supply channel applicants, and data from other similar statewide on-site generation incentive programs. The Program Administrators unanimously agreed that the adopted regional administration approach works better than a centralized administration. With a centralized administration, it would be difficult to meet customer satisfaction unless a level of service was provided that was comparable to the local administration. In particular, there might be economies of scale with one administration, but the drawback is that the centralized administration would not be familiar with utility customers or other programs. Further, distributed generation requires local presence and trained people on the ground connecting with customers. The electric and gas rate structure and interconnection rules differ from utility to utility. In addition, the retailers, distributors, and installers generally serve specific geographical regions. Regional administrators understand their customers' behaviors and can provide a distinguished level of service. The local presence enables the Program Administrators to demonstrate consumer education and program marketing support as needed. Regional administrators are able to expedite applications through better support, which will result in a greater probability of full program participation.

Supply channel program applicants and third party service providers also stated that regionally based program administration was a better approach compared to a central statewide administrator option. Demonstrating a local presence and having a working knowledge of the target customer base were two key factors mentioned by this stakeholder group.

Although Program Administrators, host applicants, and other stakeholders indicated that a regional approach to implementation was more efficient than a centralized administration, there were a number of suggested improvements to the regional implementation approach that could be better served by a central entity.

- Create a commonly developed web-based electronic Program Application system for all Program Administrators to install on their existing program websites that will help to automate common processes and streamline the application process.
- Modify the existing Program Administrators forum (statewide Working Group) to expand the objectives regarding the reviewing available technical information resources and discussing administrator-specific implementation approaches.

- Utilize a central *Call Center* to answer pre-applicant stage common program questions and concerns, in particular, screening basic applicant program issues required before applying to the program. The call center should also be used as a referral for those potential applicants moving forward and needing to speak to a Program Administrator.
- Push for greater consistency in areas where application requirements (e.g., utility service and electric interconnection agreements) are not currently consistent, but can be made more consistent.

5.3 Program Operational Efficiency Issues

Issues relating to the efficient operation and delivery of the SelfGen Incentive Program were discussed with host customers, third party applicants, and Program Administrators. Specific discussions centered on the following issues:

- Familiarity with and clarity of the applicant materials and instructions,
- Responsiveness of Program Administrators to applicants' questions,
- Whether any lack of responsiveness on the part of Program Administrators or third parties lead to delays in the application process,
- Adequacy of the SelfGen Incentive Program application 90-day and one-year requirements, and
- Level of ease/difficulty for system installation and for meeting application milestones.

Each issue is discussed below. The discussions are organized by interviewee type: host customer, third party applicant, and Program Administrator.

Familiarity with and Clarity of Application Materials and Instructions

Host customers, third party applicants, and Program Administrators were asked questions relating to their familiarity with and the clarity of the SelfGen Incentive Program application forms and instructions. Their responses and suggestions for improving the application process are discussed below.

Host Customers

Surveys administered to host customers explored whether host customers had reviewed program application materials and instructions and whether these materials and instructions were clear. Respondents were asked which parts of the application materials and instructions were not clear. Respondents were asked for suggestions on how application materials and instructions could be improved.

Level of Involvement in the Application Process. To understand the type of help received in completing the application, host customers were categorized by their involvement in the application process. For classification purposes, host customers were asked to pick one of the following three scenarios that most closely described their involvement in the application process:

- ***Self-Applicant.*** This category includes host customers who completed and submitted all the forms and had direct contact with the Program Administrators.
- ***Involved Applicant.*** This category refers to host customers who had an energy service company, contractor, or some other third party complete and submit the application forms but only after thorough consultation with the host customer.
- ***Uninvolved Applicant.*** This category includes host customers who had an energy service company, contractor, or some other third party complete and submit the application forms without much help from the host customer.

Figure 5-1 presents a breakout of host customers by application involvement. This breakout indicates that roughly 36% of sites are self-applicants, 38% are uninvolved, and 26% are involved applicants. Figure 5-2 and Figure 5-3 present breakouts of application involvement by application status¹ and distributed generation technology type. As shown, self-applicants dominate the microturbine and fuel cell technologies. Further, to date, all of the Advanced Stage applicants are either self- or involved applicants.

¹ Application status refers to *Early Stage*, applicants who have not yet obtained the 90-day proof of project advancement; *Advanced Stage*, applicants who have obtained and moved beyond the 90-day proof of project advancement; and *Withdraw/Rejection/Suspension*, which are applicants whose applications have been withdrawn, rejected, or suspended.

Figure 5-1: Host Customers' Application Involvement

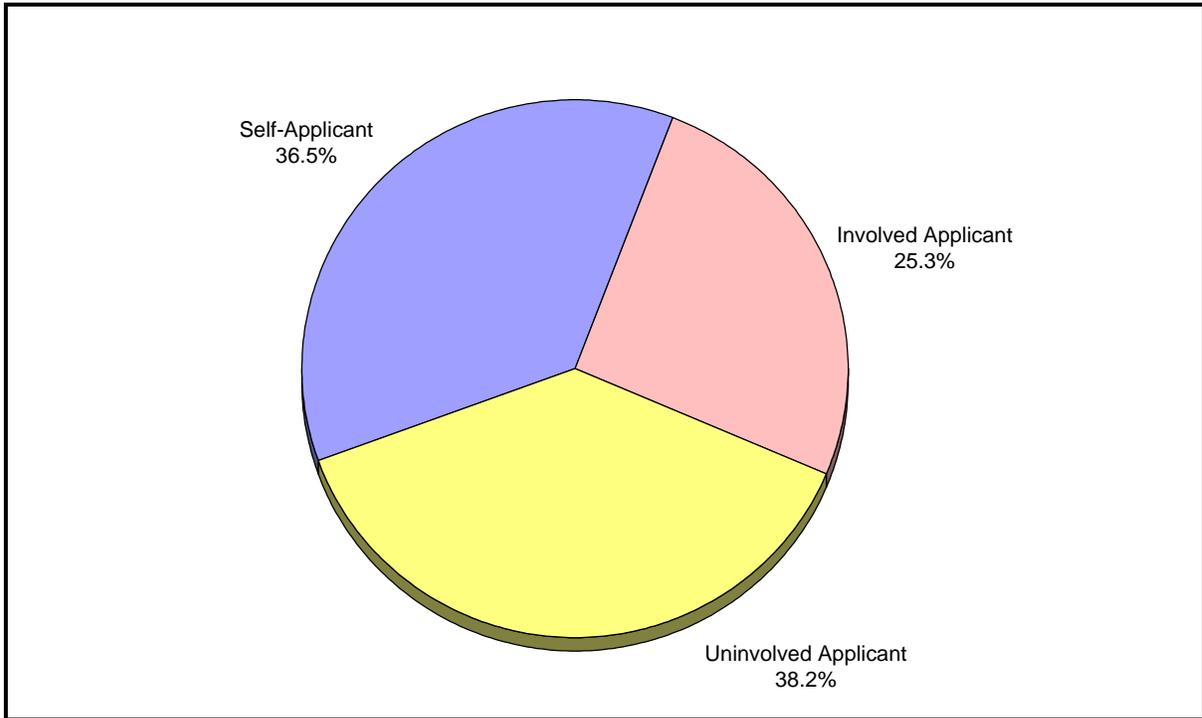


Figure 5-2: Host Customers' Application Involvement by Distributed Generation Technology

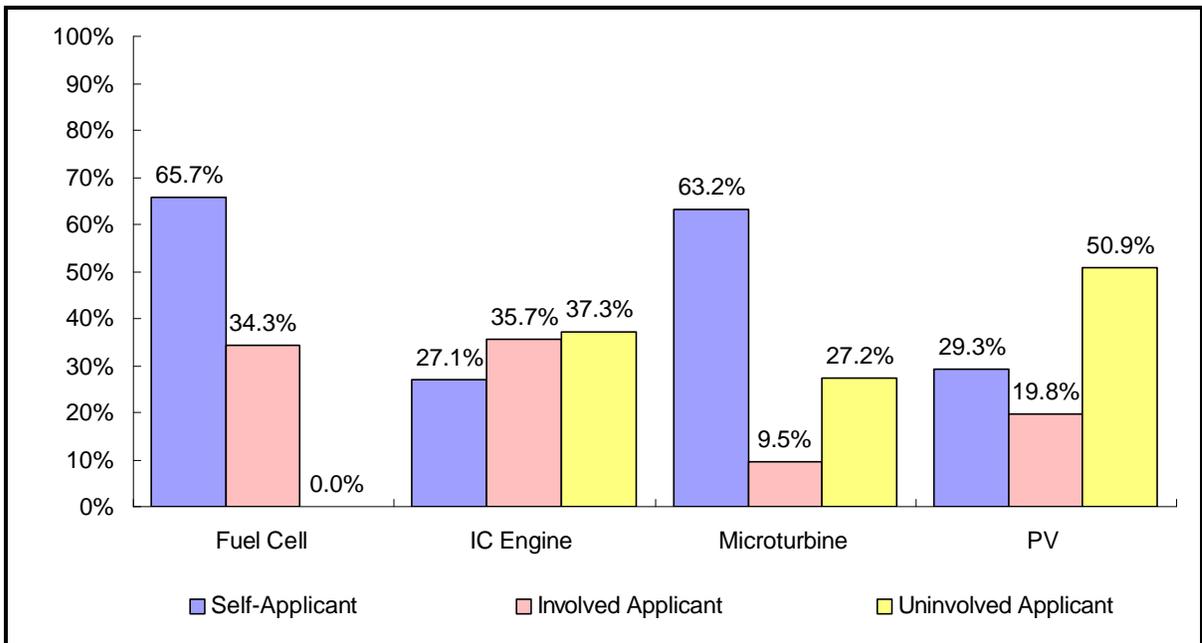
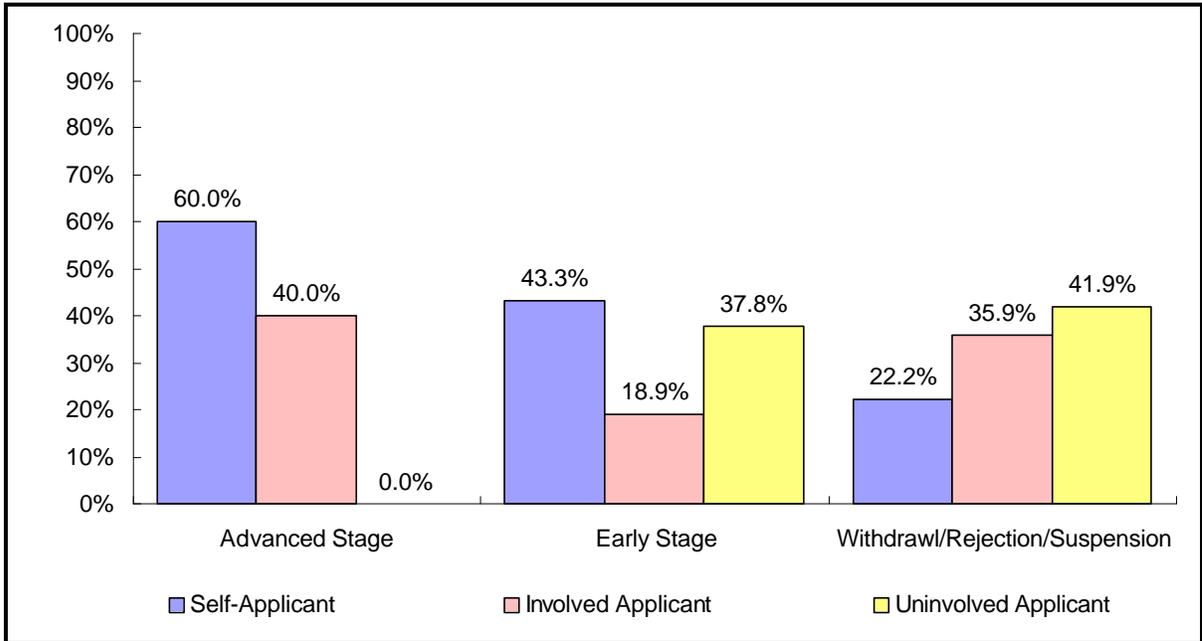
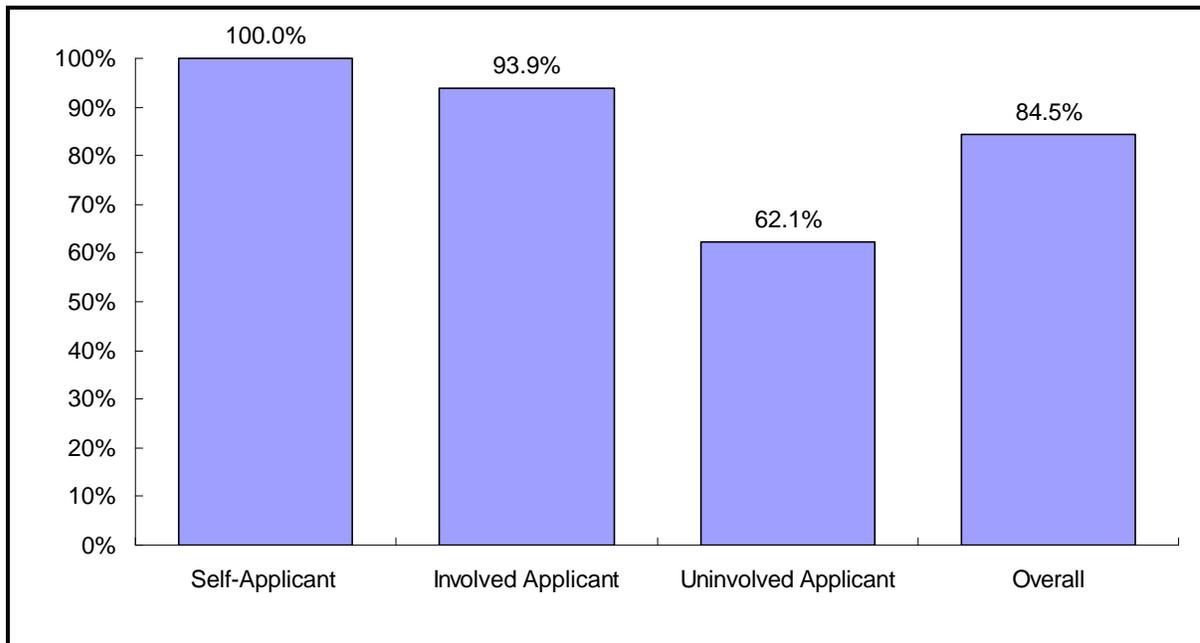


Figure 5-3: Host Customers' Application Involvement by Application Status



Review of Application Materials. Figure 5-4 summarizes host customer responses to the question “Have you reviewed the program application materials and instructions?” by application involvement. As expected, most respondents who had not reviewed the application materials were uninvolved applicants. However, it is worth noting that although host customers claim to be uninvolved in the process, a majority of them (62.1%) still took the time to review the application forms and instructions.

Figure 5-4: Percent of Host Customers Who Reviewed the Application Materials by Application Involvement



Clarity of Application Forms and Instructions. Figure 5-5, Figure 5-6, and Figure 5-7 summarize answers by host customers *who had reviewed the application materials and instructions* to the question “Were these (application materials and instructions) clear?” by applicant involvement, application status, and distributed generation technology type, respectively. These figures show that 71% and 87% of Early Stage and Withdrawal/Rejection/Suspension respondents, respectively, thought the application materials and instructions were clear. Interestingly, Figure 5-7 indicates that most respondents who used internal combustion engines or photovoltaic technology found the application materials and instructions to be clear (87% and 87%, respectively). However, fewer respondents who used microturbine technology found the application materials and instructions to be clear (47%). This is an interesting phenomenon since applicants were given the same application materials. A possible explanation is that microturbines are relatively new in the marketplace and, therefore, some levels of complexity that do not exist for more established technologies (such as internal combustion engines and solar photovoltaics) may exist for newer technologies such as microturbines and fuel cells.

Figure 5-5: Percent of Host Customers who Found the Application Forms and Instructions to be Clear by Application Involvement

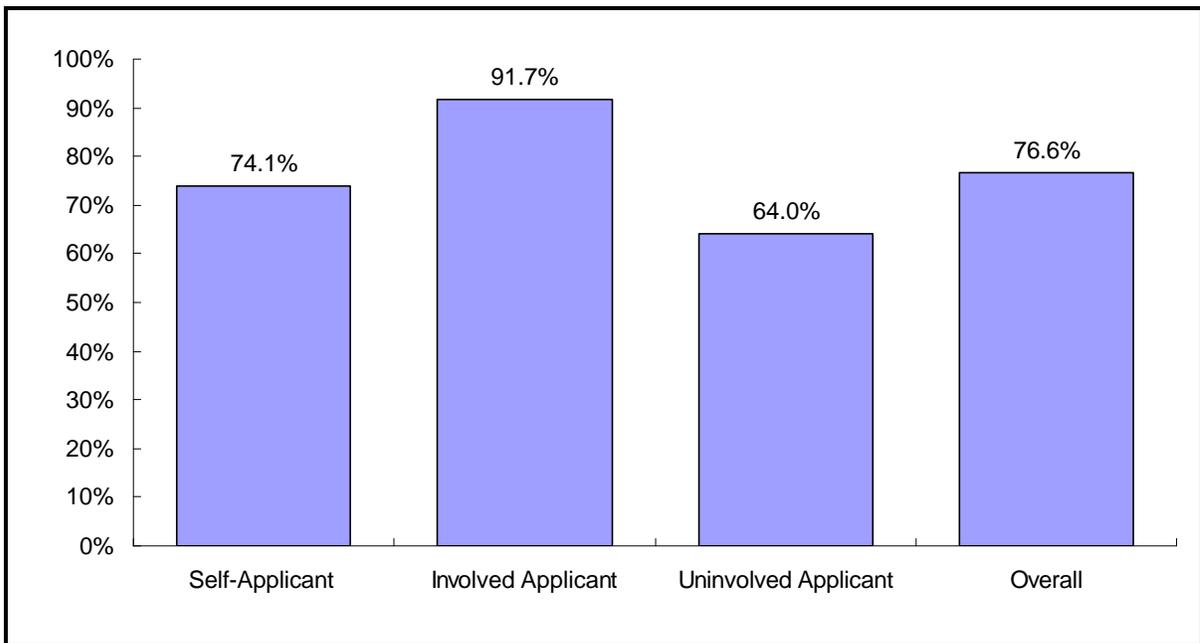


Figure 5-6: Percent of Host Customers who found the Application Forms and Instructions to be Clear by Application Status

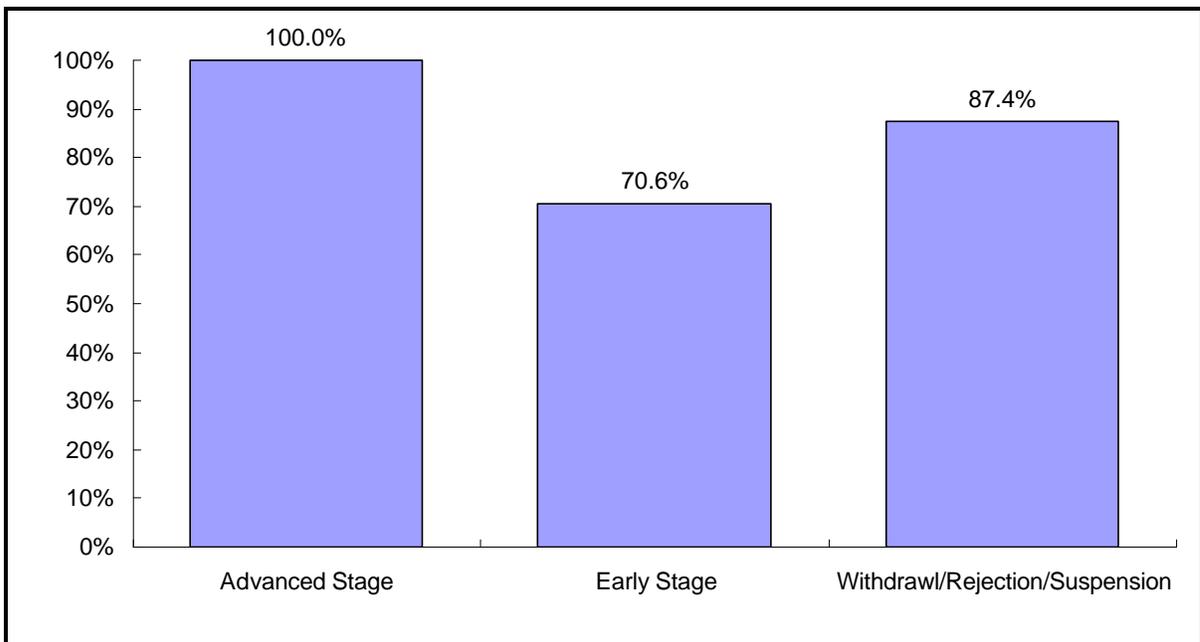
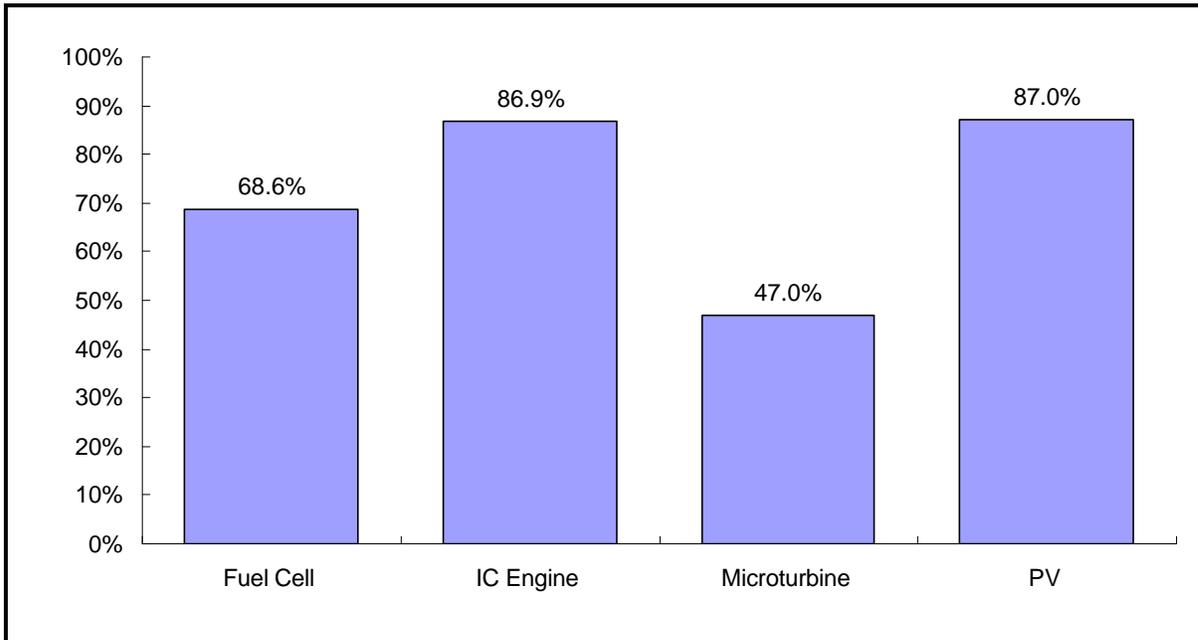


Figure 5-7: Percent of Host Customers who found the Application Forms and Instructions to be Clear by Distributed Generation Technology



Host Customer Suggestions to Improve the Application Process, Application Forms, and Instructions. When host customers were asked for suggestions for how the application materials and instructions could be improved, many indicated that a checklist would have been helpful. Note that some Program Administrators created a checklist that was sent after the application was already submitted. An easy-to-use checklist of deliverable due dates should be included and made publicly available with all the application materials in an effort to proactively expedite the application process. Respondents envisioned this checklist being one to two pages long and including a short description of each of the different stages in the program, a list of the materials/paperwork required at each stage, and a rough guideline on how long it would take to go from one point in the process to the next. Several respondents felt that having this checklist would have reduced the likelihood of scrambling for certain pieces of information on short notice.

In addition, some respondents indicated that the application materials and instructions were “bulky,” likely to have been “written by a lawyer,” “developed with bigger systems in mind,” and “complicated to understand.” Respondents also indicated that they usually could not devote the entire time of one person for the application process and, therefore, simpler application materials and instructions would have been appreciated. In an effort to address this issue, some Program Administrators created refined application instructions and materials and made these documents available on their website.

Third Party Applicants

Unlike host customers, most third party applicants are assumed to be well versed in the SelfGen Incentive Program application materials. As such, questions asked of the third parties focused on the clarity of the application forms and instructions. Figure 5-8 depicts the percent of third party applicants who found the application forms and instructions clear by distributed generation technology type. Figure 5-9 presents the same information broken out by categories based on the number of applications handled by the third party applicants.²

The application materials were perceived to be clear and satisfactory by most of the third party applicants. The exception was the third party applicants that install fuel cells. They were able to understand what was required and when it was required. The only areas of concern related to the level of detail required and, in a few cases, uncertainties regarding which project costs were eligible and the specifics of the insurance requirements.

The uncertainties surrounding the latter two areas were particularly prevalent early in the program. For instance, during the first few months of the program, there were uncertainties regarding the eligibility of specific equipment. This was an issue mainly for internal combustion systems where the heat recovery systems were used for cooling. The general breakdown between primary heat recovery equipment (eligible) and secondary equipment (ineligible) was initially not clear. Exclusion of absorption chiller equipment replacement costs was clarified in February 2002 under Decision 02-02-026. The issue of which costs are eligible also has a big impact in retrofit decisions where certain existing equipment is rendered obsolete and must be replaced. In addition, one photovoltaic third party stakeholder experienced some uncertainty regarding eligibility of panel support versus roofing treatments.

² Note that for the category of eight or more applications for internal combustion engines, there is only one third party respondent who indicated that the materials were not clear.

Figure 5-8: Percent of Third Party Applicants who found the Application Forms and Instructions to be Clear by Distributed Generation Technology

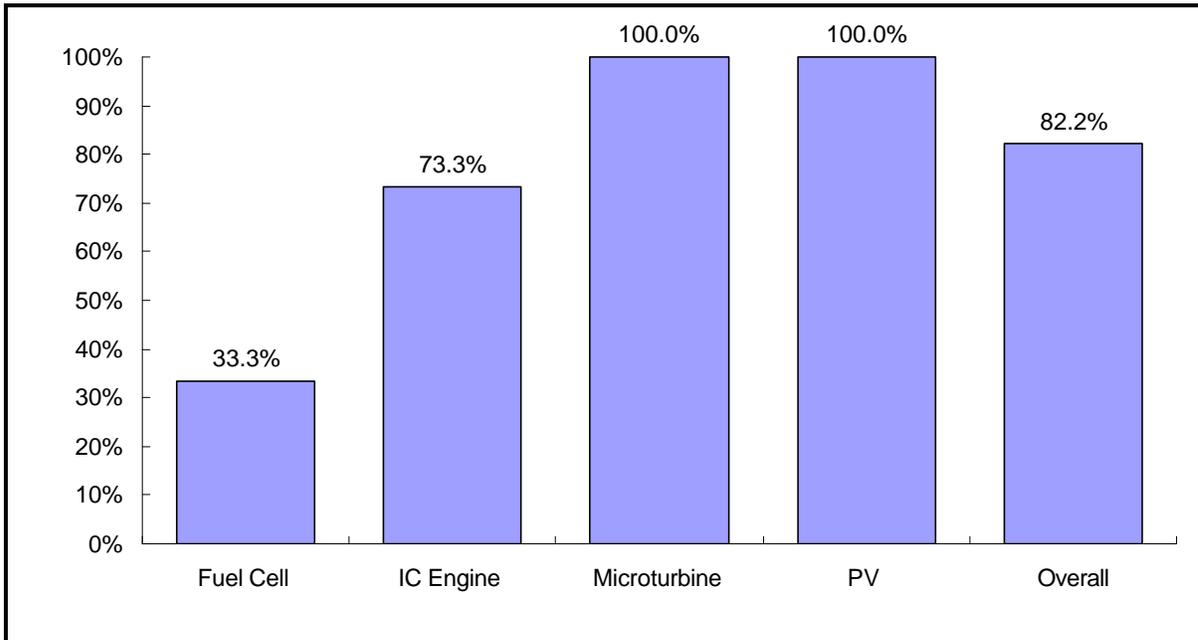
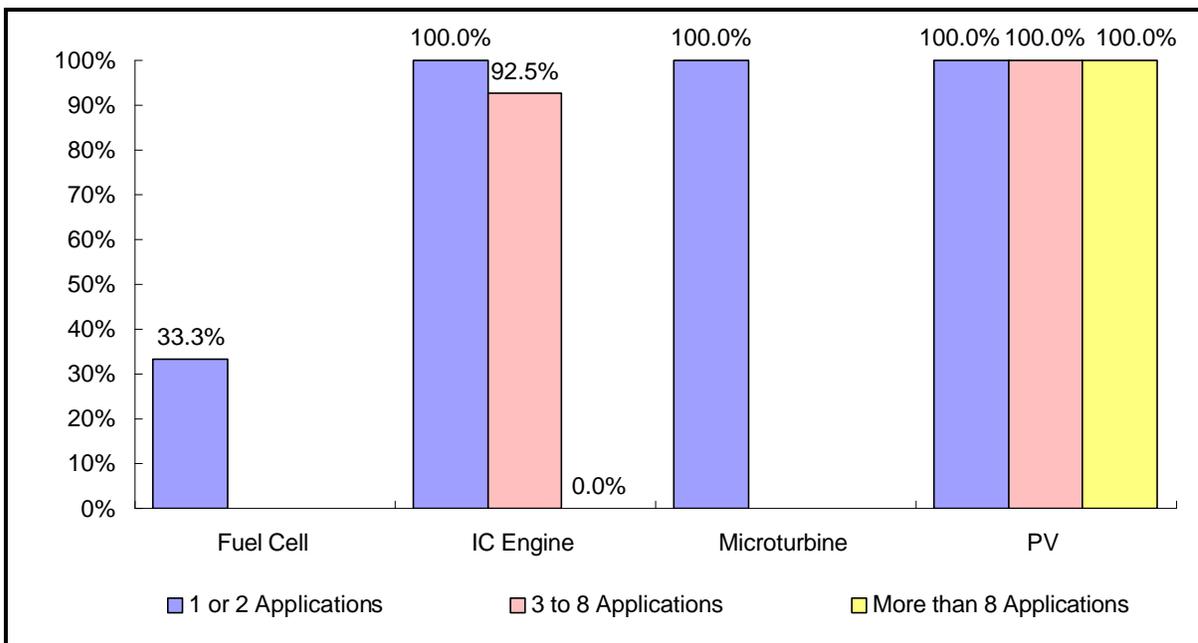


Figure 5-9: Percent of Third Party Applicants who found the Application Forms and Instructions to be Clear by Distributed Generation Technology and Number of Applications



Program Administrators

The Program Administrators spent considerable time developing the application forms and supporting materials. During the Program Administrator interviews, it was conveyed that arguably the most time-consuming part of the Program Administrator's job is educating the consumers. Specifically, the Program Administrators spend substantial time working with applicants so that they understood how to complete the application and how to read their utility bills. Common problems for applicants include detailing electric load, peak demand, and net demand requirements. From the Program Administrators' experience, some applicants do not understand rudimentary electricity elements such as the difference between watts, megawatts, and kilowatts.

Administrators' Activities to Improve the Application Materials. In an effort to improve the program application materials and instructions, the following supplemental resources were made available by some Program Administrators. These resources were developed to help the SelfGen Incentive Program applicants complete the application forms.

- **Reservation Checklist.** A reservation checklist was created based on common issues and concerns. When supporting documentation is missing from an application, the Program Administrator can send a letter with the checklist and immediately point to the missing fields.
- **Frequently Asked Questions (FAQ).** Common questions continued to arise prior to and during the application process. In response, Program Administrators created an FAQ section on their websites. Answering common questions from the onset allows Program Administrators to expedite the application process, address the goal to ensure communications and encourage fully subscribed participation in program.
- **Application Instructions.** To simplify the application process, Program Administrators created an eight-page instructions document to help clarify the application requirements.
- **Waste Heat Recovery Worksheet.** Another common issue is understanding the heat recovery requirements. The waste heat recovery worksheet, created after the initial implementation of the program, contains a step-by-step detailed guide on how to calculate the waste heat recovery rates.

In addition to these already available materials, Program Administrators suggested a number of other potential additions to the application materials. For instance, a simple step-by-step guide explaining the difference between Watts, kilowatts and kilowatt-hours and instructions on how to interpret utility bills could be made available to applicants. This would help address host customer concerns relating to understanding energy use at their site, which is critical when completing the application form.

By making adjustments to simplify the application process and the application forms, Program Administrators can save time and expedite applications. Further, the Program Administrators should make the program application material enhancements available to all applicants in order to improve program consistency. Improvements are expected with the updated version of the SelfGen Incentive Program handbook scheduled for release in the second quarter of 2002.

The SelfGen Incentive Program handbook now includes the following additional sections:

- Alternate system sizing for photovoltaics within equipment eligibility,
- Incentive limits for systems with output capacity above 1.0 MW, and
- Eligible and ineligible project costs within incentive levels.

Responsiveness of Program Administrators to Applicants' Questions

The responsiveness of the Program Administrators to questions from the SelfGen Incentive Program applicants is critical to the operation efficiency of the program. Host customers, third party applicants, and Program Administrators were asked questions relating to this issue. In addition, host customers were asked if any lack of responsiveness by the Program Administrators or third parties resulted in delays. Responses are discussed below.

Host Customers

Surveys administered to host customers investigated the responsiveness of the Program Administrators' answers to host customer questions relating to the application process. In addition, host customers were asked if lack of responsiveness by Program Administrators (or third parties) was causing delays in system implementation. Respondents were asked how these delays could be decreased.

Figure 5-10 and Figure 5-11 summarize host customer answers to the question, "Has the Program Administrator provided satisfactory answers to your questions about the program?" Answers are categorized by application status and distributed generation technology type. The overwhelming response by host customers was that the Program Administrators were responsive and provided satisfactory answers to the host customer's questions.

Figure 5-10: Percent of Host Customers who Indicated that the Program Administrators Provide Satisfactory Answers to Host Customer’s Questions by Application Status

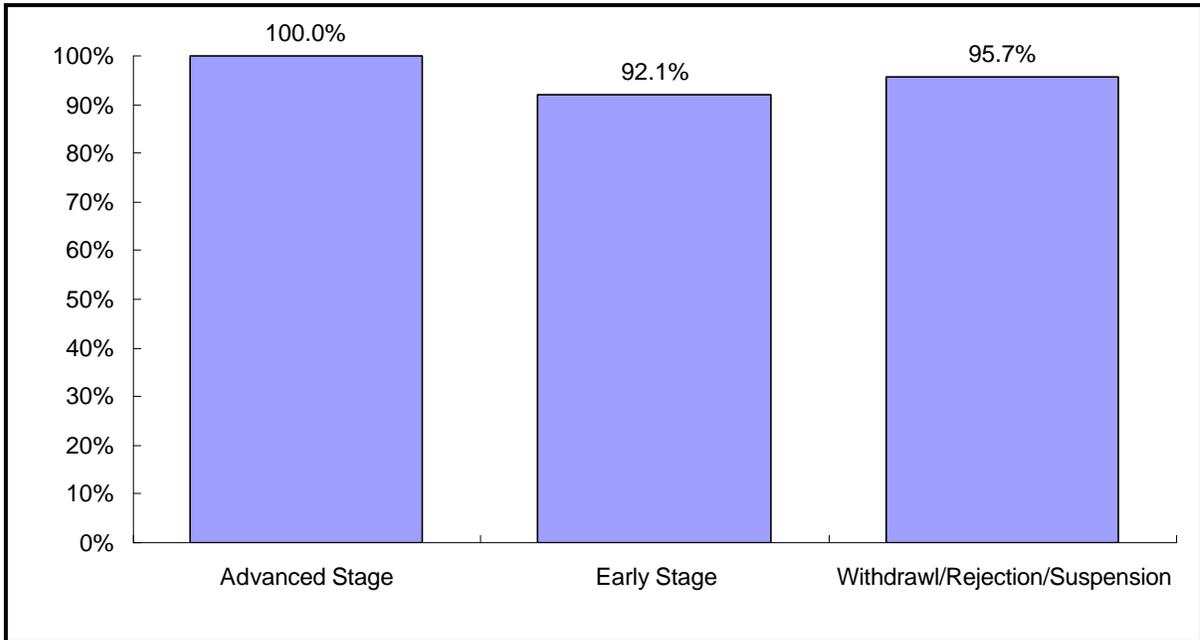
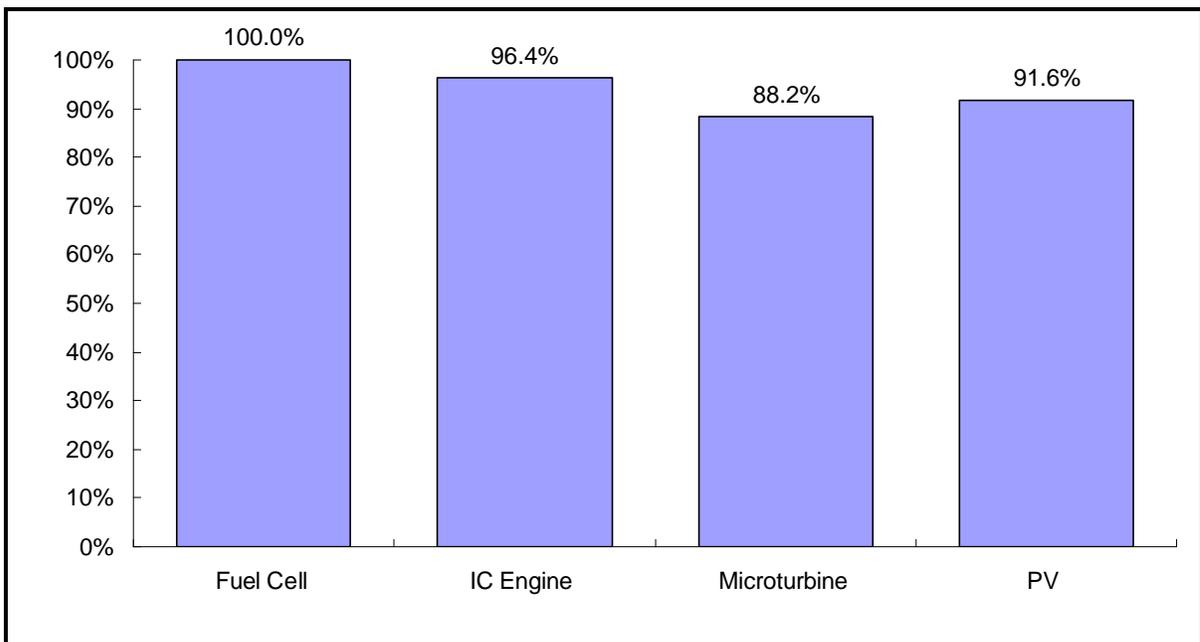
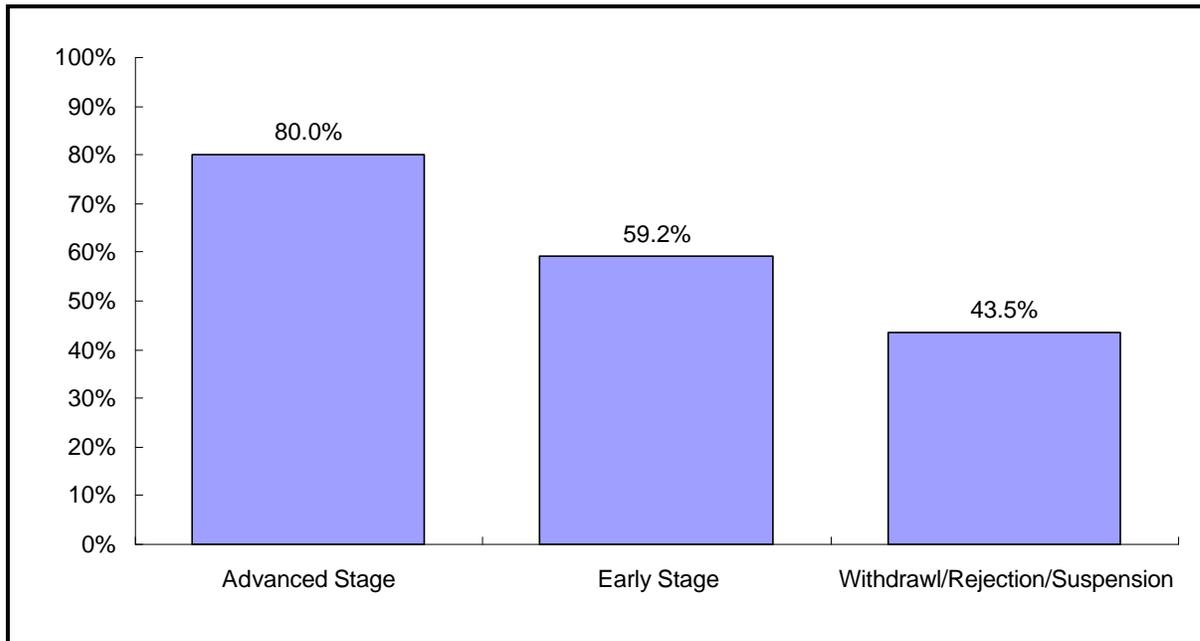


Figure 5-11: Percent of Host Customers who Indicated that the Program Administrators Provide Satisfactory Answers to Host Customer’s Questions by Distributed Generation Technology



Host customers were also asked about interaction with the Program Administrators during the application approval process. Figure 5-12 summarize answers (by application status) to the question, “Did the administrator contact you after you submitted your application but before it was approved?” Figure 5-12 shows that 80% of Advanced Stage, 59% of Early Stage, and 43% of Withdrawal/Rejection/Suspension respondents had the Program Administrator contact them before making a decision on the application.

Figure 5-12: Percent of Host Customers who Indicated that the Program Administrator Contacted them after they Submitted an Application but before it was Approved by Application Status



Most respondents who reported that Program Administrators had contacted them after submission of their application also reported that this contact had been helpful. These respondents also reported that the Program Administrator contacted them for one of the following reasons:

- To remind them of documentation that had not yet been submitted,
- To remind them of upcoming deadlines, or
- To clarify some questions that Program Administrators had regarding the submitted application.

Does any Lack of Responsiveness to Questions by Administrators or Third Parties lead to Delays in the Application Process? Figure 5-13 and Figure 5-14 summarize host customers’ answers to the question, “Based on your experiences with your project so far, have there been any unnecessary delays caused by either the third party or the Program Administrator or

both?” Answers are categorized by application status and distributed generation technology type. Figure 5-13 and Figure 5-14 show that 14% of Early Stage respondents and 3% of Withdrawal/Suspension/Rejection respondents believed delays had been caused by the Program Administrator. A further 2% of Early Stage respondents and 2% of Withdrawal/Suspension/Rejection respondents reported that their delays were caused by the third party applicant. All of the Advanced Stage respondents indicated that delays were caused by third parties and not Program Administrators.

Respondents who claimed their delays had been caused by the Program Administrator usually indicated that these delays were due to the difficulty present in obtaining interconnection agreements from the utility. In addition, respondents felt that it would be helpful to have one person (in the Program Administrator office) assigned as the “customer service representative” and that all questions with the application process be addressed to this customer service representative. Respondents believe having one person assigned as their customer service representative would ensure more continuity in the application process.

Figure 5-13: Percent of Host Customers who Indicated that there were Unnecessary Delays Caused by the Program Administrator, the Third Party, or Both by Application Status

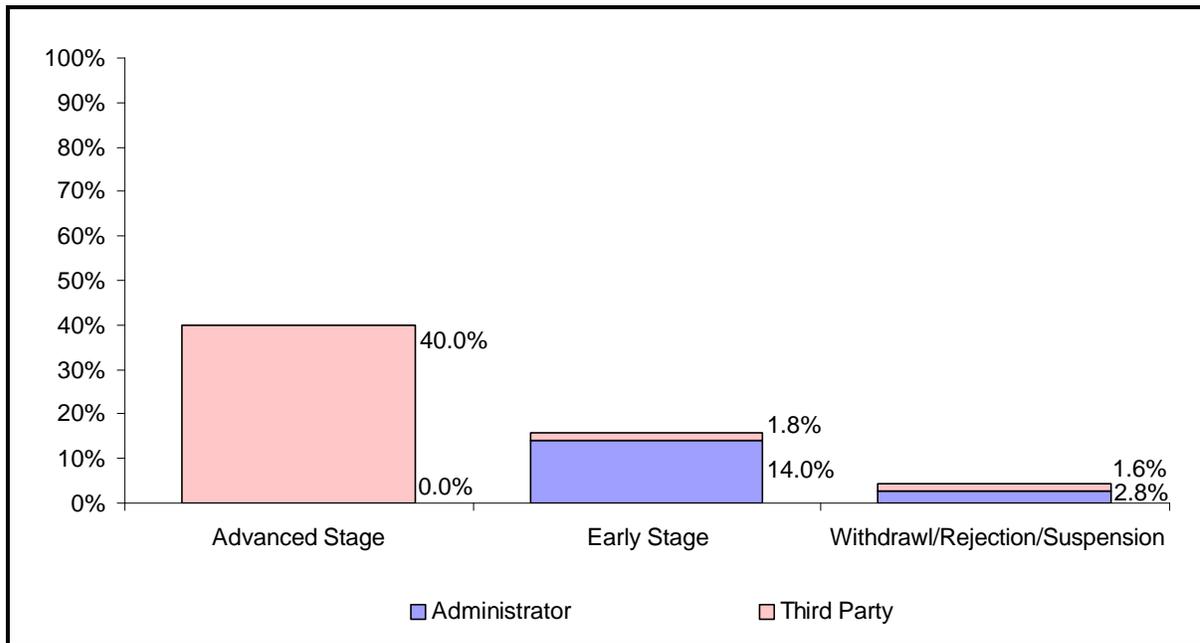
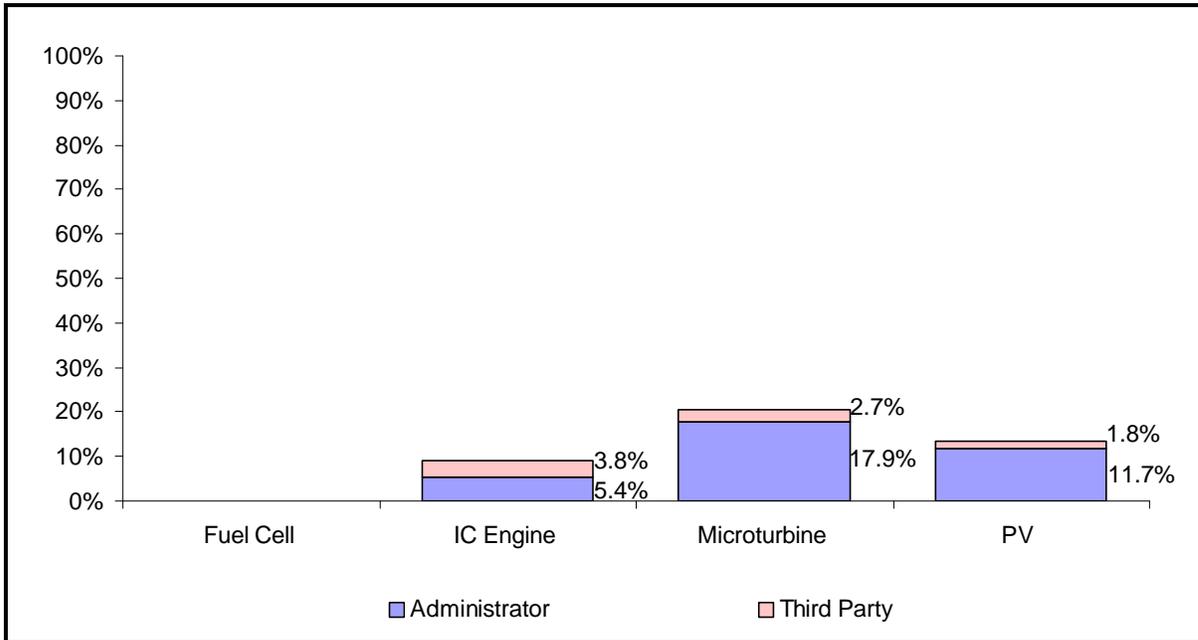


Figure 5-14: Percent of Host Customers who Indicated that there were Unnecessary Delays Caused by the Program Administrator, the Third Party, or Both by Distributed Generation Technology



Third Party Applicants

All third party applicants interviewed were satisfied with the responsiveness of the Program Administrators. Further, third party applicants indicated that Program Administrators acknowledged receipt of applications and responded to their questions about the program application and project implementation process in a timely manner. Program Administrators were viewed as generally able to answer questions, although some complex questions took time to obtain responses from either the Statewide Working Group or the CPUC. Third party applicants had very few complaints about lost applications or other paperwork.

Program Administrators

Communication protocols vary across Program Administrators, but contact with applicants to obtain clarification and notification of a required milestone is common, especially before the 90-day proof of project advancement deadline. According to the Program Administrators, the applicant is notified by e-mail and letter close to the 90-day deadline regarding the status of their application. Additional communication will depend on the situation. In many cases, the Program Administrators require additional detail from the applicant. For applicants in the suspended category, regular contact is made to assess the status of their application.

In some cases, Utility Program Administrators reward account executives with a commission for each of their customers who complete the application process. The account executives

will follow up with the applicants throughout the process since the commission is based upon project completion. It was also noted that one Program Administrator recently hired a consultant to review the applications so they could spend more time on project management and customer contact. Another Program Administrator will soon begin using a tracking system that can automatically send out e-mails to applicants and remind the Program Administrators of pending deadlines on specific projects.

Adequacy of the SelfGen Incentive Program Application 90-Day and One-Year Deadlines

Two major milestones in the SelfGen Incentive Program application process are fulfilling the Proof of Project Advancement (or so-called 90-day requirement) and the one-year project completion requirements.

Providing Proof of Project Advancement (90-day requirement). One milestone in the application process is to provide (and receive approval for) proof of project advancement. Providing proof of project advancement includes the following elements:

- Submitting an air pollution permit application,
- Submitting an electrical interconnection application,
- Ordering the generating equipment,
- Obtaining proof of insurance,
- Providing waste heat recovery calculations, and
- Providing project cost breakdown.

One-Year Project Completion (One-Year Requirement). Each generating system must be completed within one year of the issuance of the Conditional Reservation Notice. The completed system must conform to the specifications approved by the Program Administrator, either those in the Reservation Request Form or subsequent adjustments approved by the Program Administrator. Specifically, each applicant must submit the following materials within one year of receiving the Conditional Reservation Notice:

- The completed Reservation Confirmation and Incentive Claim Form,
- Copies of the final building inspection report,
- Final equipment and installation invoice,
- Proof of warranty,
- Proof of permission to run in parallel with the electric utility,
- Air permitting documentation (Incentive Levels 2 and 3 only),
- Revised system sizing calculations, and
- Final cost breakdown with supporting documentation.

After receiving these materials, the Program Administrator conducts an inspection of the generating system. The inspectors verify the following:

- The capacity of the generating system (the final incentive amount is based on this measured capacity),
- That the generating system is operational and interconnected with the electric utility grid, and
- That the waste heat recovery equipment is operational (Incentive Levels 2 and 3 only).

If the inspection is satisfactory, the Program Administrator issues the incentive check approximately 30 days after the inspection. If the inspection is unsatisfactory, the Program Administrator notifies the applicant and describes the reasons for the failed inspection. The applicant has 14 calendar days to bring the system into compliance. The Program Administrator then conducts a final inspection to approve or disapprove the generating system.

A number of closed-ended questions and in-depth discussions were completed with host customers, third parties, and Program Administrators that address the adequacy of the time allowed to complete the 90-day and one-year application requirements.

Host Customers

Responses from host customers relating to the 90-day and one-year program requirements are discussed below.

90-Day Proof of Project Advancement. Figure 5-15, Figure 5-16, and Figure 5-17 summarize responses to the question, “In your case, do you think the initial 90-day deadline provided sufficient time for providing proof of project advancement?” Responses are categorized by application status, distributed generation technology type, and by building sector. In general, less than 50% of all host customers believe that the 90-day deadline is sufficient to meet the application requirements. However, this overall result disguises the substantial difference in responses across application status. In particular, Figure 5-15 shows that all Advanced Stage respondents indicated that 90 days was sufficient to show proof of project advancement. However, less than 30% of Early Stage respondents and less than 50% of Withdrawal/Suspension/Rejection indicated that the 90-day deadline was sufficient for providing proof of project advancement.

Figure 5-16 indicates that host customers installing microturbines have the most confidence in meeting the 90-day deadline (43%), and those installing photovoltaics the least confidence at just under 29%. Another possible issue with meeting the 90-day deadline is differences

across building sectors. Figure 5-17 presents a summary of host customer responses by building sector. A review of these results indicates that schools, hospitals, warehouses, and offices have levels below 10%. In the case of schools and hospitals, this inability to meet the deadlines could be attributable to budgeting cycles being inconsistent with the 90-day deadlines. This finding is consistent with information gathered from the Program Administrators who suggested that building sectors such as schools and hospitals were presenting the biggest challenge relative to meeting the 90-day requirement deadline.

Figure 5-15: Percent of Host Customers who Indicated that the 90-Day Proof of Project Advancement Deadline is Sufficient by Application Status

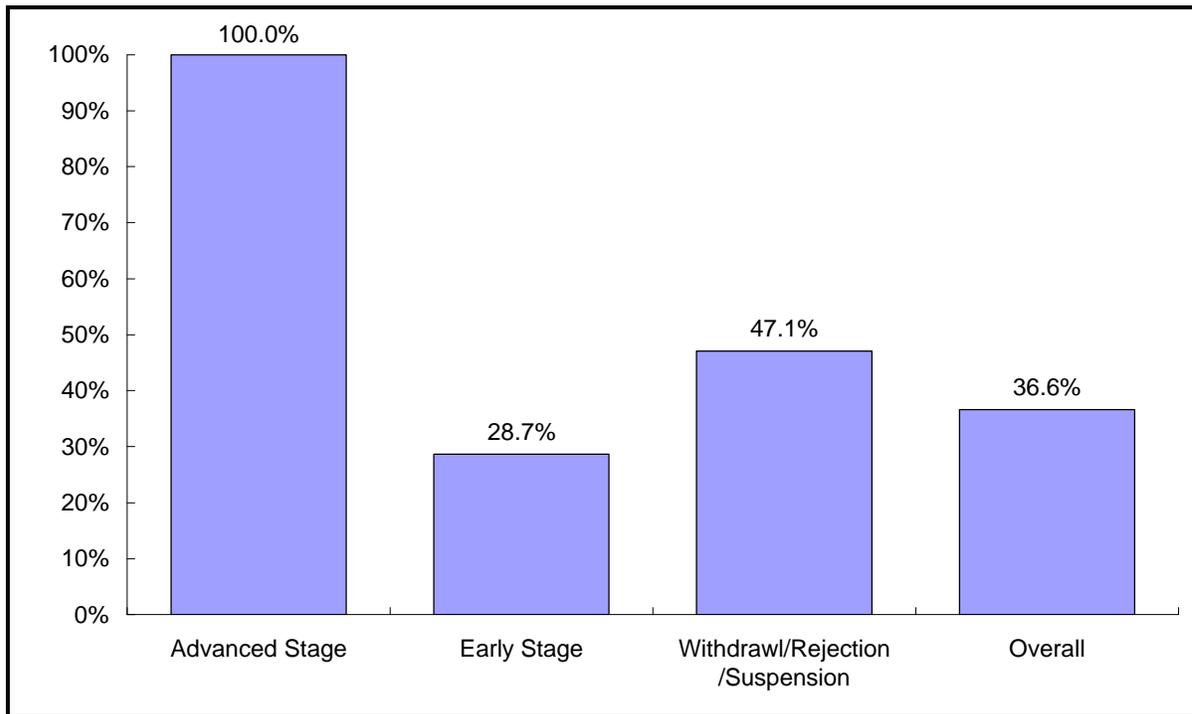


Figure 5-16: Percent of Host Customers who Indicated that the 90-Day Proof of Project Advancement Deadline is Sufficient by Distributed Generation Technology

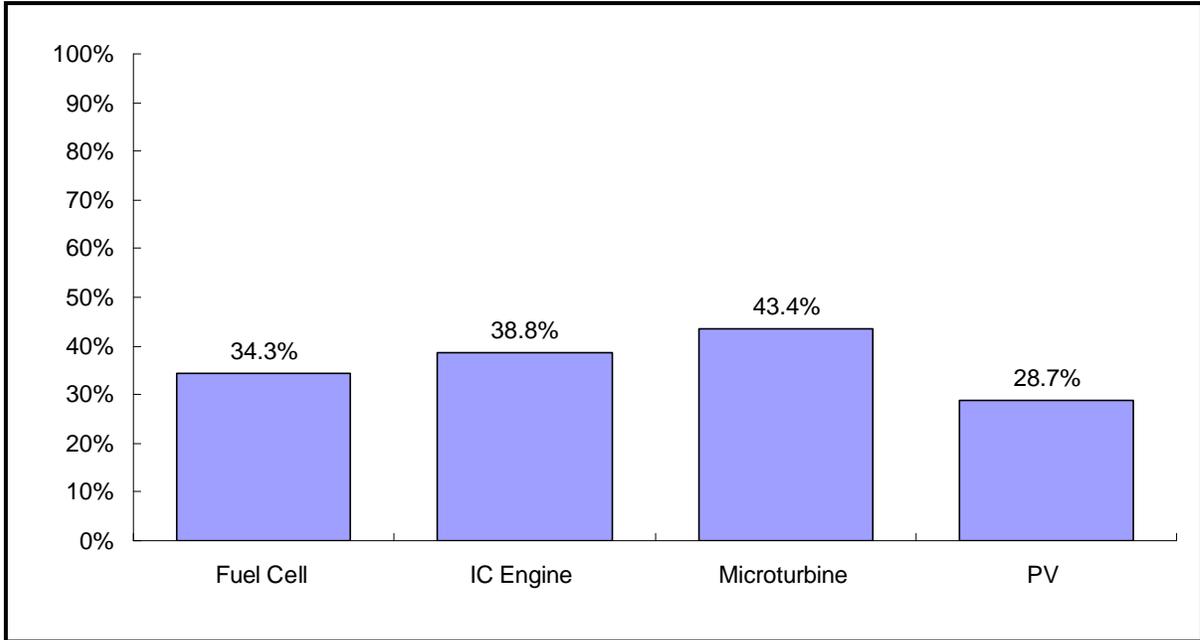
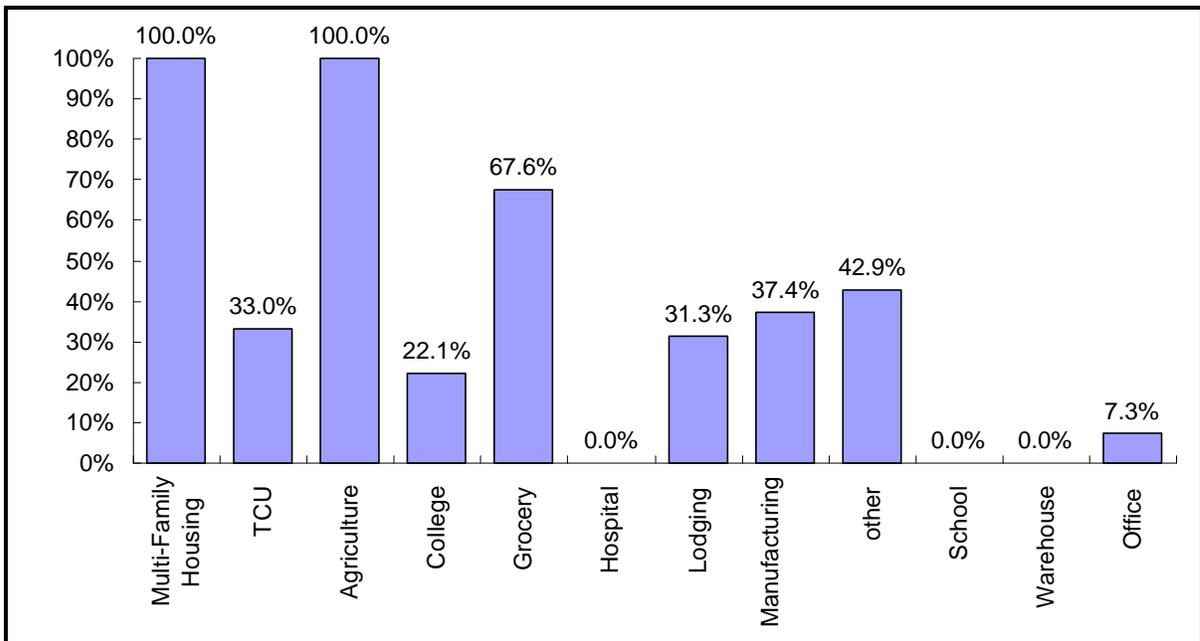


Figure 5-17: Percent of Host Customers who Indicated that the 90-Day Proof of Project Advancement Deadline is Sufficient by Building Type



Host customers who indicated that the 90-day requirement deadline was not sufficient were asked why that was the case. Responses to this question are summarized in Table 5-1. Many of the responses were generic in nature; the respondent simply indicated that the internal decision-making and approval process within their organization made it difficult to meet the 90-day deadline. These responses were classified as “other,” because they did not involve specific components of the 90-day requirement.

It is also interesting to note that 10% of the Withdrawal/Suspension/Rejection respondents indicated that their applications had been withdrawn/suspended/rejected because they could not meet the 90-day deadline to provide proof of project advancement.

Table 5-1: Summary of Host Customers’ Reasons Why the 90-Day Deadline is Insufficient by distributed generation technology

	Overall	Fuel Cell	IC Engine	Micro-turbine	Photo-voltaic
Submit Air Pollution Permit Application	16%	0%	25%	0%	8%
Submit Electrical Interconnect Application	3%	0%	0%	0%	8%
Order the Generating Equipment	25%	0%	30%	0%	25%
Obtain Proof of Insurance	4%	0%	0%	0%	11%
Provide Waste Heat Recovery Calculations	0%	0%	0%	0%	0%
Provide Project Cost Breakdown	4%	0%	0%	0%	11%
Other	47%	100%	45%	100%	36%

One-Year Project Completion. Host Customers were also asked, “Do you think the one-year deadline would be sufficient for completing installation of a system like the one you applied for?” Responses to these questions are summarized in Figure 5-18, Figure 5-19, and Figure 5-20 by application status, distributed generation technology, and building sector.

Host Customers who indicated that the one-year deadline was not sufficient were asked why that was the case. Responses are summarized in Table 5-2. Of the Early Stage respondents who indicated that the one-year deadline would not be enough to complete installation, long equipment delivery times and building permit issues were cited as the main reason.

Respondents who cited building permit issues as a barrier to system installation within one year were referring to issues related to new building construction and permit approval. As with the similar question about the 90-day deadline, many of the responses to this question simply indicated that the 1-year deadline was not sufficient, given the internal decision-making and approval process within their organization. These responses were classified as “other.”

Figure 5-18: Percent of Host Customers who Indicated that the One-Year Deadline is Sufficient for Completing Installation of their proposed System by Application Status

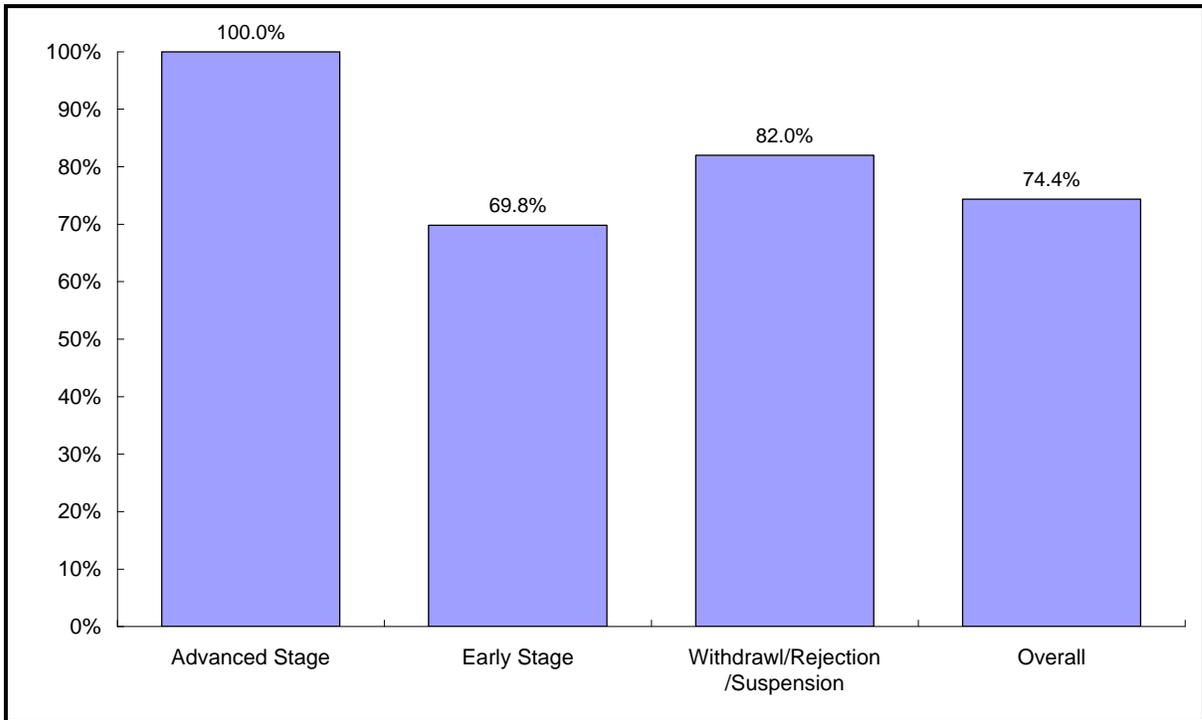


Figure 5-19: Percent of Host Customers who Indicated that the One-Year Deadline is Sufficient for Completing Installation of their Proposed System by Distributed Generation Technology

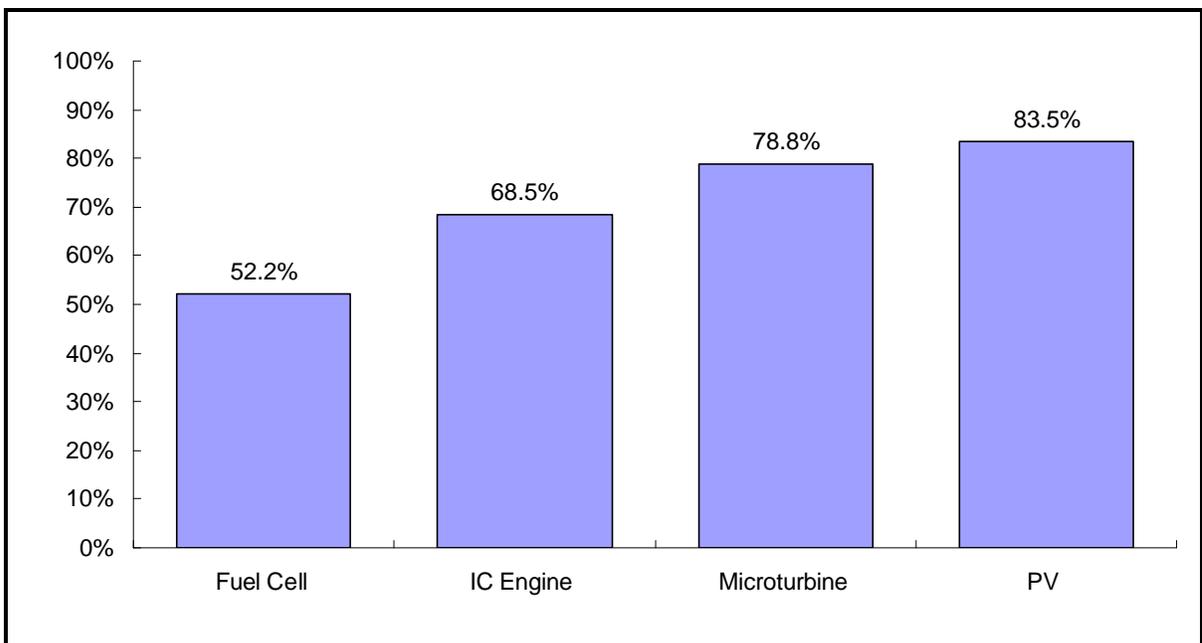


Figure 5-20: Percent of Host Customers who Indicated that the One-Year Deadline is Sufficient for Completing Installation of their Proposed System by Building Type

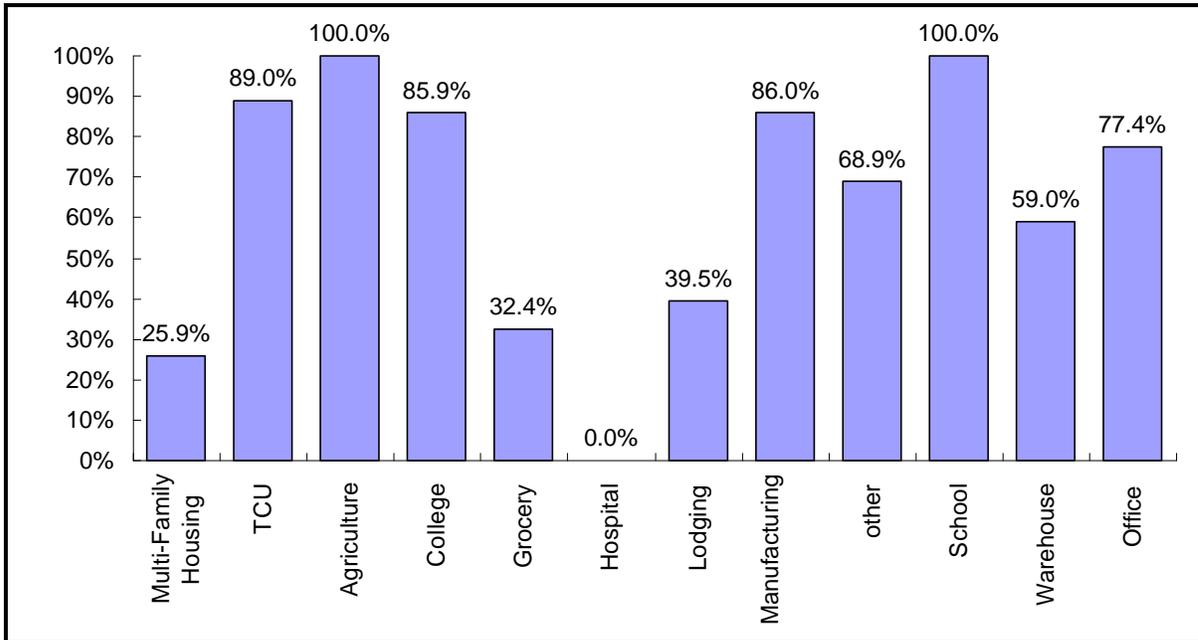


Table 5-2: Summary of Host Customers’ Reasons Why the One-Year Deadline is Insufficient by distributed generation technology

	Overall	Fuel Cell	IC Engine	Micro-turbine	Photo-voltaic
Time for Manufacturer to Ship Equipment	13%	-	12%	37%	0%
Installation Delays by the Contractor	0%	-	0%	0%	0%
Air Pollution Permitting Issues	0%	-	0%	0%	0%
Other Local Permit Issues	7%	-	12%	0%	0%
Building Permit Issues	7%	-	12%	0%	0%
Meeting Waste Heat Recovery Requirements	0%	-	0%	0%	0%
Interconnection with Utility	0%	-	0%	0%	0%
Financing the Purchase/ Installation of Equipment	0%	-	0%	0%	0%
Other	73%	-	64%	63%	100%

Third Party Applicants

Responses from third party applicants relating to the 90-day and one-year program requirements are discussed below.

90-Day Proof of Project Advancement. Third party applicant perceptions of the adequacy of the project timelines for the proof of project advancement are quite varied. Figure 5-21 presents the percent of third party applicants who indicated that the 90-day deadline to show proof of program advancement was sufficient, by distributed generation technology type.

Third party Incentive Level 1³ applicants, in general, see the deadlines as beneficial, in that it forces the host customers to make a decision and to proceed with the project in a expeditious manner. Third party Incentive Level 3⁴ applicants, notably microturbine system applicants, find the 90-day requirement quite difficult to meet. Areas of stated difficulty include the required breakout of project cost, proof of purchase order, project insurance requirements, submittal of interconnection and Air Pollution Control District/Air Quality Management District (APCD/AQMD) air emissions permit applications.

Third parties who indicated that the 90 days were insufficient to meet the proof of project advancement deadline were asked to identify reasons. Table 5-3 summarizes these reasons. As shown in Table 5-3, the third party applicants indicated that application submittal for air permit and electric interconnection, completing the design, providing project cost breakdowns, and ordering equipment, has been difficult to complete within 90-day deadline.

³ Level 1 applications cover photovoltaics, small wind, fuel cells using renewable fuel distributed generation technologies.

⁴ Level 3 applications include internal combustion engines, microturbines and small gas turbines distributed generation technologies.

Figure 5-21: Percent of Third Party Applicants who Indicated that the 90-Day Proof of Project Advancement Deadline is Sufficient by Distributed Generation Technology

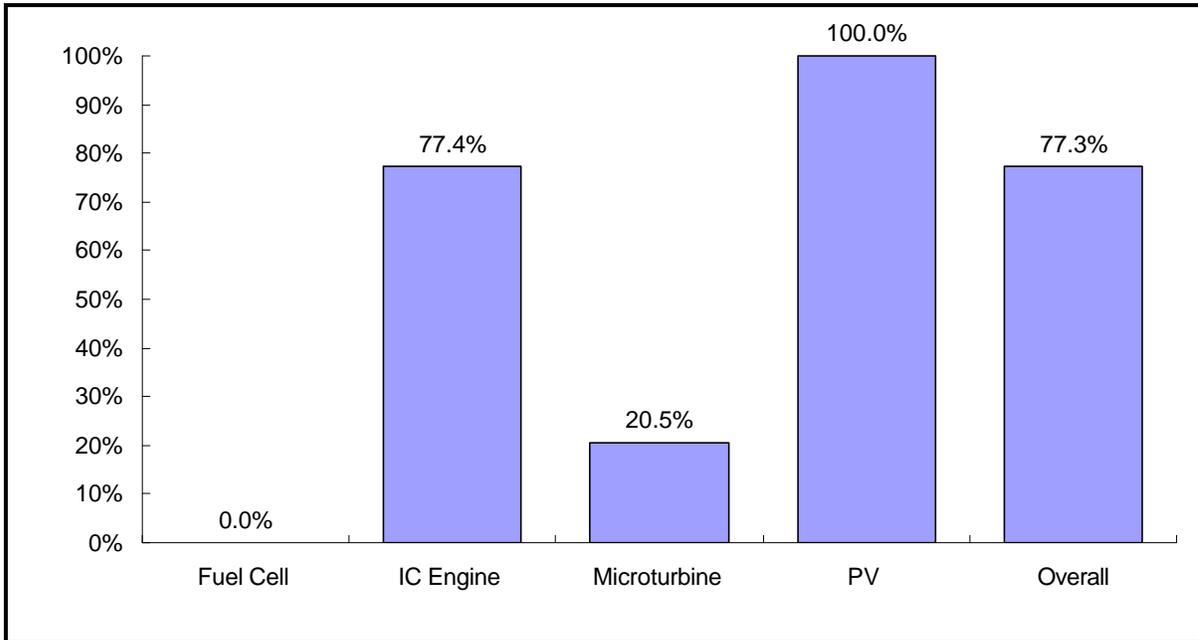


Table 5-3: Summary of Third Party Applicants Reasons Why the 90-Day Proof of Project Advancement Deadline is Insufficient by Distributed Generation Technology

	Overall	Fuel Cell	IC Engine	Micro-turbine	Photo-voltaic
Submit Air Pollution Permit Application	17%	-	19%	15%	-
Submit Electrical Interconnect Application	32%	-	41%	15%	-
Order the Generating Equipment	17%	-	19%	15%	-
Obtain Proof of Insurance	7%	-	11%	0%	-
Provide Waste Heat Recovery Calculations	5%	-	0%	15%	-
Provide Project Cost Breakdown	16%	-	11%	27%	-
Other	5%	-	0%	15%	-

One-Year Project Completion. Figure 5-22 presents the percent of third party applicants who indicated that the one-year completion deadline was sufficient, by distributed generation technology type. Third parties who suggested that one year was insufficient time to complete projects were asked to identify reasons. Table 5-4 summarizes their responses. As shown in Table 5-4, the time constraints were generally perceived to be related to financing the purchase and installation of the system, obtaining the equipment from the manufacturer, and delays due to utility interconnection studies and air pollution permitting. Designing and installing the systems were not usually the limiting factors, except for construction delays in new construction. For retrofit installations, some third parties mentioned delays associated with shutting down operations to allow the interconnection for the new equipment.

Third party applicants also noted that receiving the air quality permit was a factor beyond the control of the third party or host applicant or Program Administrator, which could delay project completion beyond one year. This was the case for primarily for internal combustion systems. In addition, when discussing the difficulties associated with the insurance requirements, third party applicants indicated that the indemnification by third parties can be difficult to obtain. In some cases, third party applicants noted that the errors and omission insurance requirements necessitated hiring specialty electrical and mechanical engineering firms, which increased the expense and delayed the project.

Figure 5-22: Percent of Third Party Applicants who Indicated that the One-Year Deadline is Sufficient for Completing Installation of their Proposed System by Distributed Generation Technology

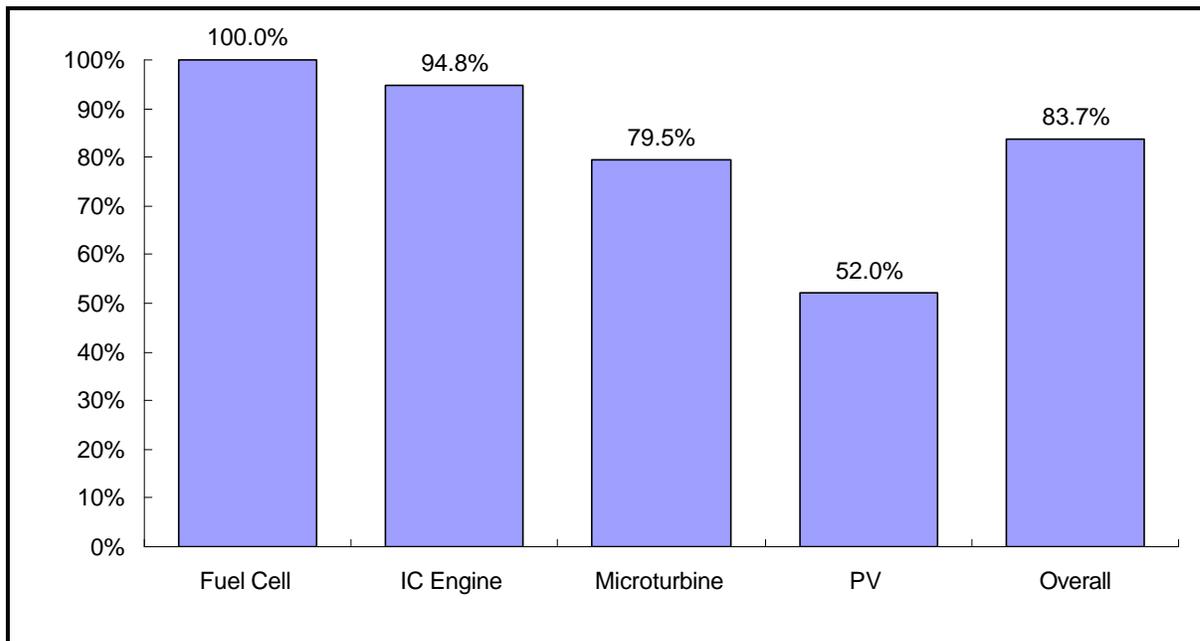


Table 5-4: Summary of third Party Applicants Reason Why the One Year Deadline is Insufficient by Distributed Generation Technology

	Overall	Fuel Cell	IC Engine	Micro-turbine	Photo-voltaic
Time for Manufacturer to Ship Equipment	22%	-	0%	0%	33%
Installation Delays by the Contractor	0%	-	0%	0%	0%
Air Pollution Permitting Issues	10%	-	50%	0%	0%
Other Local Permit Issues	0%	-	0%	0%	0%
Building Permit Issues	6%	-	0%	50%	0%
Meeting Waste Heat Recovery Requirements	0%	-	0%	0%	0%
Interconnection with Utility	10%	-	50%	0%	0%
Financing the Purchase/ Installation of Equipment	22%	-	0%	0%	33%
Other	28%	-	0%	50%	33%

Program Administrators

Highlights of conversations with Program Administrators relating to the 90-day and one-year program requirements are discussed below.

90-Day Proof of Project Advancement. The Program Administrators unanimously support the 90-day deadline because it expedites the application process and eliminates applications, from customers who cannot realistically finance the projects or who are not committed to completion of the project. Program Administrators also indicated if the duration were shorter, that applicants might have a more difficult time meeting the proof of project advancement requirement, thus impacting total program participation goals.

Although, from a Program Administrator’s perspective, the current 90-day timeframe supports the goal to provide adequate lead-time for key program milestones, the Program Administrators indicated that they often extend the 90-day deadline. This indicates that the 90 days might *not* be sufficient for all the proof of project advancement materials. Program Administrators evaluate each application independently and may issue an extension. Common reasons for deadline extensions include the following:

- Reasons out of customer’s control,
- Internal workings of customer organizations,
- Assumptions are confusing,
- Waiting on authorizations, and
- Utility interconnection is an especially difficult task.

According to the Program Administrators, approximately 16% of applicants had difficulty with the 90-day deadline. Interestingly, one third party provider who spoke with a Program Administrator thought 90 days was too long, since it provides more time for applicants to obtain competitive bids from other third party providers.

One-Year Project Completion. At the time of the face-to-face interviews, only a few projects were approaching the one-year deadline. As such, Program Administrators have only limited experiences interacting with applicants approaching the one-year deadline. This meant that they could not complete a thorough analysis regarding the effectiveness of the secondary deadline. However, Program Administrators suggested that the one-year deadline might not be sufficient (especially for school districts, hospitals and other organizations that have longer decision-making processes). In particular, three-quarters (75%) of the Program Administrators indicated that schools and governments need more time to approve and implement their projects. Governments and school systems typically need one year to obtain funding and must time projects with their budget cycle.

One issue that the Program Administrators did mention is that they want to be able to extend the one-year completion deadline for active projects that have valid reasons for needing an extension.

Level of Ease/Difficulty for System Installation and for Meeting Application Milestones

The SelfGen Incentive Program application process has a number of milestones. This section addresses issues relating to the ease or difficulty in meeting these milestones from the perspective of host customers and Program Administrators.

This section also discusses the likelihood that projects will be completed based on self-reported data from host customers and reasons why host customers have withdrawn from the SelfGen Incentive Program.

Host Customers

The ease or difficulty in meeting application milestones and the likelihood of project completions were discussed with host customers. A summary of responses is provided below.

Difficulty of Meeting Application Milestones. Surveys administered to host customers explored the level of difficulty that applicants experienced in completing different steps in the application and installation processes. In particular, respondents were asked to “rank the difficulty of the following project development milestones on a scale of 1 to 5, with 1 being not difficult at all and 5 being very difficult.”

- Selecting a manufacturer
- Selecting an installer/integrator/contractor
- Interconnection engineering with utility
- Meeting waste heat design requirements (where applicable)
- Providing detailed cost estimates
- Obtaining air emissions permits (where applicable)
- Obtaining a warranty for the system
- Project construction
- Utility pre-parallel inspection
- System operational performance tests

Table 5-5 and Table 5-6 summarize the mean levels of difficulty reported by host customers with active⁵ and inactive⁶ applications, respectively, for meeting various project milestones. As seen in Table 5-5, host customer with active applications indicated that the top two most difficult milestones to meet were obtaining the interconnection engineering agreement with the utility and obtaining air emissions permits. In fact, active applicants using microturbine, photovoltaic, and fuel cell technology ranked obtaining the interconnection agreement as the most difficult milestone to meet (difficulty levels of 3.1, 2.5, and 3.0, respectively). Active applicants using internal combustion technology ranked obtaining the interconnection agreement second most difficult milestone to meet after obtaining air emissions permits (difficulty levels of 2.7 and 2.9, respectively). When active applicants were asked to discuss the problems they had obtaining interconnection engineering agreements, the following two reasons were cited most often.

- First, the paperwork submitted by the host customers for the interconnection engineering agreement seemed to travel through several departments within the utility. As documents passed from one department to another, responses to host customer applicant's questions became inconsistent, leaving applicants frustrated with the process.
- Secondly, some active host customer applicants indicated that the paperwork required for interconnection engineering agreements was tailored to large systems (i.e., larger than the systems incentivized by the SelfGen Incentive Program). Applicants related that the extensive paperwork and investigation was not necessary for systems as small as the ones for which they had submitted applications.

Table 5-6 summarizes the levels of difficulty in meeting various project milestones as reported by inactive host customers. Many of the inactive applicants were not as far along in

⁵ Active applicants are early and advanced stage applicants combined.

⁶ Inactive applicants are withdrawal/suspension/rejection applicants.

the application process as the active applicants. As such, inactive applicants indicated milestones that are faced earlier in the application process as being more difficult. In particular, providing detailed cost estimates and selecting a manufacturer were the two most difficult milestones to meet for inactive applicants.

Table 5-5: Average Level of Difficulty in Meeting Project Milestones – Active Host Customer Applicants (5 = very difficult and 1 = not at all difficult)

Milestone	Total N = 51	Technology			
		IC Engine N=23	Micro- turbine N=14	Photo- voltaic N=12	Fuel Cell N=2
Selecting a manufacturer	2.29 n=38	2.39 n=18	2.30 n=10	2.38 n=8	1.00 n=2
Selecting installer/integrator/contractor	2.19 n=37	2.00 n=17	2.82 n=11	2.00 n=7	1.00 n=2
Interconnection engineering w/utility	2.81 n=32	2.73 n=15	3.11 n=9	2.50 n=6	3.00 n=2
Meeting waste heat design requirements	1.83 n=30	1.88 n=16	1.80 n=10	N/A	2.50 n=2
Providing detailed cost estimates	2.43 n=35	2.31 n=16	2.91 n=11	1.83 n=6	2.50 n=2
Obtaining air emissions permits	2.64 n=22	2.86 n=14	2.80 n=5	N/A	1.50 n=2
Obtaining a warranty for the system	1.88 n=26	2.18 n=11	2.13 n=8	1.17 n=6	1.00 n=1
Project construction	1.90 n=21	1.60 n=5	2.22 n=9	2.00 n=5	1.00 n=2
Utility pre-parallel inspection	2.00 n=8	2.00 n=1	2.67 n=3	1.00 n=2	2.00 n=2
System operational performance tests	1.67 n=6	2.00 n=1	2.00 n=2	* n=1	1.50 n=2

Table 5-6: Average Level of Difficulty in Meeting Project Milestones – In Active Host Customer Applicants (5 = very difficult and 1 = not at all difficult)

Milestone	Total	Technology			
		IC Engine	Micro-turbine	Photo-voltaic	Fuel Cell
Selecting a manufacturer	2.67 n=18	3.00 n=7	1.80 n=5	3.00 n=5	3.00 n=1
Selecting installer/integrator/contractor	2.19 n=16	2.43 n=7	1.50 n=4	2.75 n=4	1.00 n=1
Interconnection engineering w/utility	2.50 n=10	2.80 n=5	2.50 n=2	2.00 n=2	2.00 n=1
Meeting waste heat design requirements	2.23 n=13	2.50 n=6	2.00 n=5	2.00 n=2	* n=0
Providing detailed cost estimates	2.93 n=14	3.17 n=6	2.80 n=5	2.00 n=2	4.00 n=1
Obtaining air emissions permits	1.90 n=10	1.60 n=5	3.00 n=2	N/a n=1	1.00 n=1
Obtaining a warranty for the system	1.57 n=14	1.40 n=5	1.25 n=4	1.75 n=4	3.00 n=1
Project construction	2.57 n=7	2.00 n=2	3.50 n=2	2.00 n=2	3.00 n=1
Utility pre-parallel inspection	1.75 n=4	* n=0	2.00 n=1	2.00 n=2	1.00 n=1
System operational performance tests	1.67 n=3	1.00 n=1	* n=0	2.00 n=2	* n=0

Likelihood of Project Completion. Inactive host customers were asked to answer the question, “Are you still planning to install your system despite the fact that your application has been withdrawn/rejected/suspended.” Table 5-7 summarizes responses to these questions. Interestingly, 53% of respondents whose applications were withdrawn/suspended/rejected are still planning to install their systems.

Table 5-7: Percent of Inactive Host Customer Applicants still likely to complete their Distributed Generation Project

Respondent Answer	Total	Technology			
		IC Engine	Micro-turbine	Photo-voltaic	Fuel Cell
Percent indicating still likely to install	53%	50%	25%	75%	100%

Reasons for Withdrawal from the SelfGen Incentive Program. Thirty survey respondents were inactive applicants. When asked why their applications had been withdrawn, suspended, or rejected, they specified a number of reasons as detailed below.

- Six respondents indicated that their applications had been rejected because they had missed the deadline for submitting the required materials. Of these six respondents, four were microturbine applications and two were internal combustion applications. None of the six respondents could remember exactly which deadlines they missed, but half of the respondents who cited this reason indicated that they had missed the deadline to submit proof of project advancement.
- Six respondents indicated that their applications were withdrawn or rejected because their system did not qualify (3), did not meet waste heat requirements (2), or was too large (1).
- Four respondents indicated that they had withdrawn their application because of the current economic uncertainty, which did not justify large capital expenditures.
- Two respondents indicated that they had withdrawn their applications because the cost of the system was too high.
- Eight respondents cited other reasons, such as their company being sold and new management not going forward with the application, internal management not being committed to the idea, design changes to the system, and the need for more information.
- Four respondents were not able to provide much information as to why their applications had been withdrawn/suspended/rejected.

Program Administrators' Perceptions

Program Administrators were asked to rank the relative difficulty *to the applicant* of meeting various project milestones, based on their interactions with the applicants. The following table presents the average score of each milestone on a scale of 1 to 5, with 1 being “not difficult at all” and a 5 being “very difficult.” Responses of “not applicable” (N/A) are not included in the overall average; however when all Program Administrators indicated not applicable (N/A), “N/A” appears in the table.⁷

Areas causing the greatest difficulty to applicants, according to the Program Administrators, included interconnection with utility, meeting waste heat design requirements, and system operational performance tests.⁸ Areas of medium difficulty included providing detailed cost estimates, obtaining air emissions permits, selecting an installer/integrator/contractor, and

⁷ Program Administrators replied with “not applicable” if they had not had contact with customers regarding that particular milestone (for a particular technology).

⁸ Most Program Administrators had not yet dealt with the system operation performance tests, although those who responded expressed concern over this milestone.

project construction. Areas of least difficulty included selecting a manufacturer, utility pre-parallel inspection, and obtaining a warranty for the system.

Table 5-8: Average Level of Difficulty in Meeting Project Development Milestones – Program Administrators Perceptions of Applicants (5 = very difficult and 1 = not at all difficult)

Project Development Milestone	Total	Photo-voltaic	Wind	Fuel Cell	Small Gas Turbine	Micro-turbine	IC Engine
Selecting a manufacturer	1.22	1.67	1.00	1.00	1.00	1.00	1.67
Selecting an installer/integrator/contractor	2.50	2.33	3.00	3.00	2.00	2.33	2.33
Interconnection with utility	2.94	2.67	3.00	3.00	3.00	3.00	3.00
Meeting waste heat design requirements	3.00	n/a	n/a	3.00	3.00	3.00	3.00
Providing detailed cost estimates	2.06	1.67	2.00	2.00	2.00	2.33	2.33
Obtaining air emissions permits	2.17	n/a	n/a	2.00	2.00	2.00	2.67
Obtaining a warranty for the system	1.33	1.00	1.00	1.00	1.00	2.00	2.00
Project construction	2.42	2.00	2.00	2.00	2.00	3.50	3.00
Utility pre-parallel inspection	1.33	1.00	1.00	1.00	1.00	2.00	2.00
System operational performance tests	3.00	n/a	n/a	n/a	n/a	3.00	3.00

5.4 Program Acceptance and Satisfaction

Host customers and third party applicants were asked about issues relating to acceptance of and satisfaction with the SelfGen Incentive Program.

Host Customers

Host customers were asked to rate their “overall satisfaction with the SelfGen Incentive Program on a scale of 1 to 5, with 1 being very dissatisfied and 5 being very satisfied.” Early Stage host applicants and Withdrawn/Suspended/Rejected respondents rated their satisfaction with the program at 4.2 and 4.3, respectively, while the Advanced Stage respondent level was slightly higher at 4.5. These results are illustrated in Figure 5-23 below.

The average satisfaction is also summarized by technology type for host applicants in Figure 5-24. The internal combustion applicants had the highest rating while the fuel cell applicants had the lowest.

Figure 5-23: Host Average Satisfaction by Applicant Type

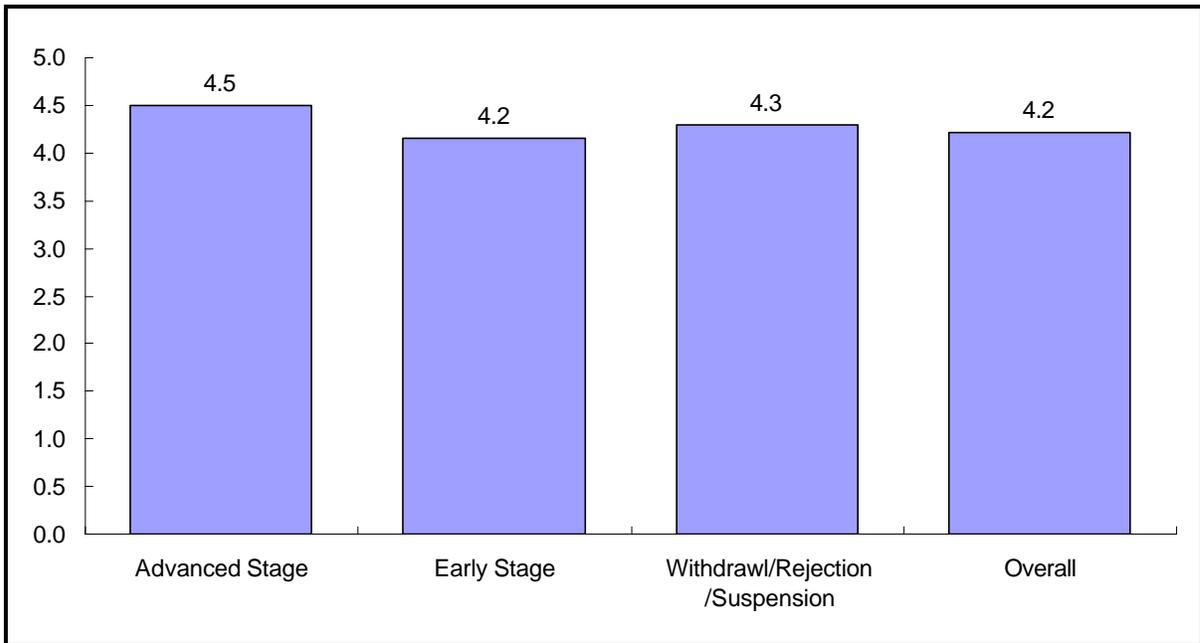
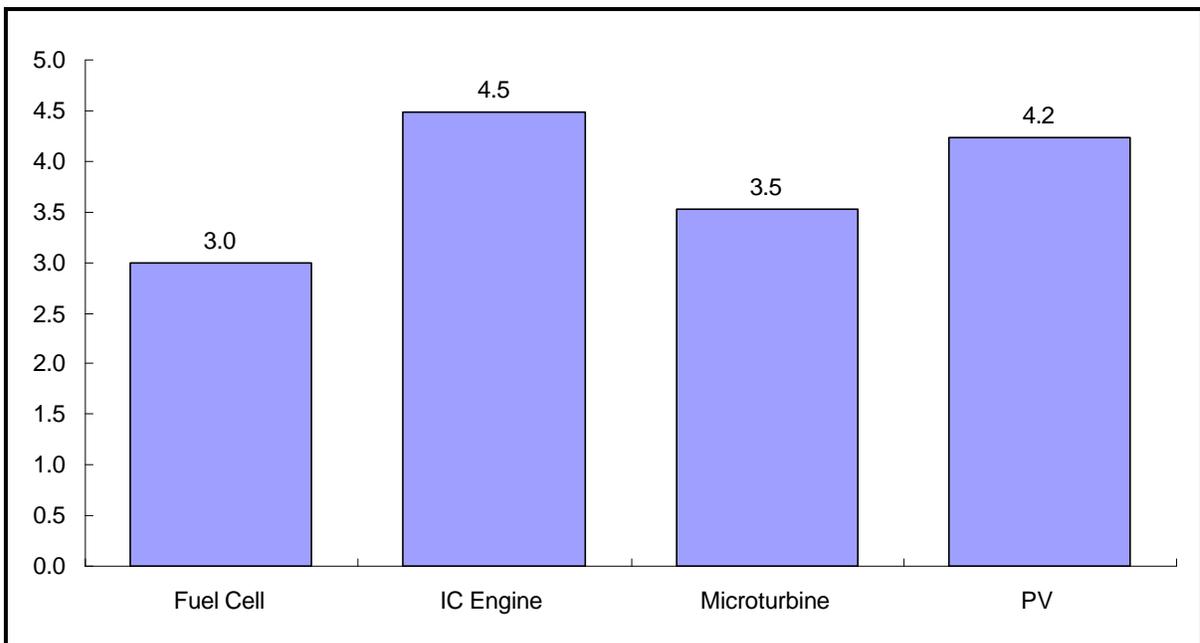


Figure 5-24: Host Average Satisfaction by Technology Type

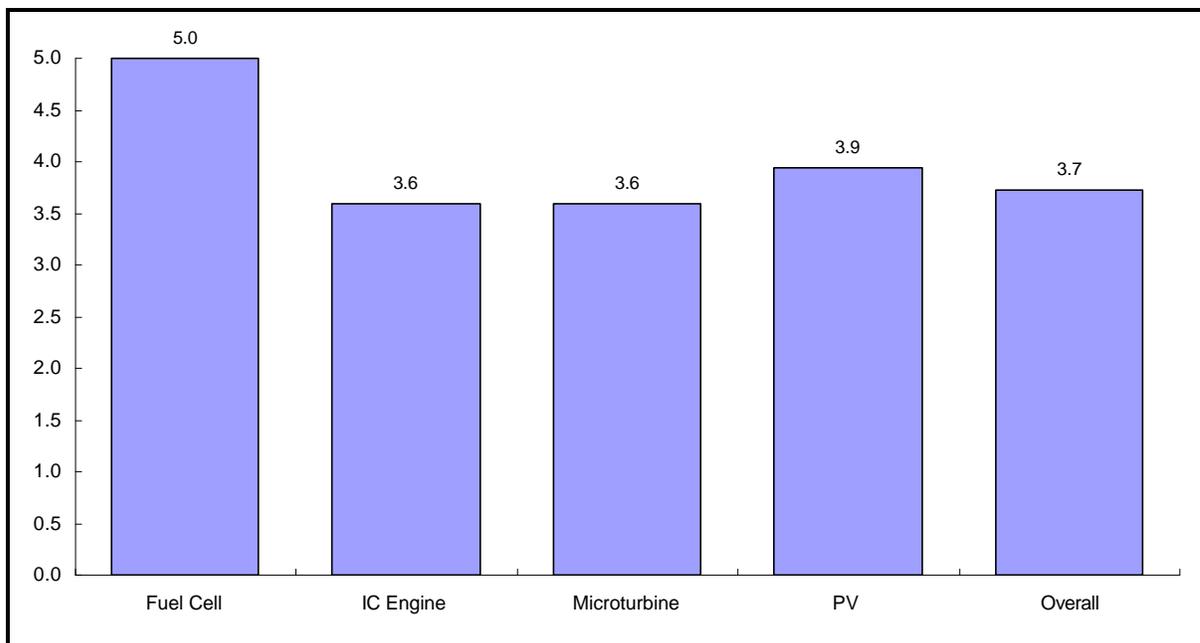


Third Party Applicants

Third party suppliers and manufacturers were almost unanimously appreciative of the existence of the program. Photovoltaic third party suppliers clearly appreciated the availability of incentives funds for these larger commercial applications. CEC Buydown funding has been over-subscribed for quite some time now. Microturbine and internal combustion system suppliers appreciated the availability of the program, as it is has generally been the only long-term incentive program consistently available for these technologies.

Third party applicant satisfaction levels were lower than the host applicants with a rating of 3.7. The satisfaction by distributed generation technology type, illustrated in Figure 5-25, was relatively consistent with the exception of fuel cells.

Figure 5-25: Average Satisfaction for Third Party Applicants by Distributed Generation Technology



5.5 Program Awareness

This section contains information related to program awareness gathered from surveys of nonparticipant host customers. Interviews with third party applicants and host customer applicants reveal sources of information for consumers who are already aware of the SelfGen Incentive Program. This section explores the following issues:

- The level of awareness according to nonparticipating customers,
- How host applicants are learning about the program,
- Details related to program marketing satisfaction according to the third party distributors, and
- The inclusion of SelfGen Incentive Program information into the sales process of third party distributors.

The insights discussed in the section could help the Program Administrators determine which marketing efforts have the greatest impact on program participation and to draft an enhanced strategic marketing plan for the remainder of the program.

Nonparticipant Host Customers

Nonparticipant host customers were also asked to indicate if they knew they could generate their own power, whether they were aware of the SelfGen Incentive Program, whether they were aware of the CEC Buydown Program, and, if they were aware of the SelfGen Incentive Program, how they found out about it. Of 300 respondents, 60.8% indicated they were aware they could generate their own power. When asked to specify their awareness of self-generation programs, 8.8% of nonparticipants indicated they were aware of the CEC Buydown Program and 12.3% indicated they were aware of the SelfGen Incentive Program.

Effective Methods of Disseminating Information to Nonparticipating Host Customers

In order to reach the SelfGen Incentive Program participation goals, the Program Administrators need to know how information about the program can best reach nonparticipating host customers. By examining the responses of nonparticipants who are not aware of the program and determining which methods will most likely reach them, the Program Administrators can plan future marketing programs that are appropriately targeted to increase market awareness. In addition, insights regarding how nonparticipants already aware of the SelfGen Incentive Program learned about the program can demonstrate which marketing methods are working.

Figure 5-26 and Figure 5-27 summarize the most effective ways to distribute information about the SelfGen Incentive Program to nonparticipating target customers who are not aware of the SelfGen Incentive Program.

Figure 5-26 shows that the most successful methods for reaching unaware nonparticipating host customers include contact by a utility representative or government agency (CEC, CPUC) and flyers in utility bills. Many respondents indicated other means of communication, such as local radio stations, local news stations, public works or waste environment federations, and the Wall Street Journal, as being effective methods for disseminating information about the SelfGen Incentive Program.

Figure 5-26: Average Rating of Popular Marketing Methods According to Nonparticipating Target Customers Not Aware of SelfGen Incentive Program (5 = very difficult and 1 = not at all difficult)

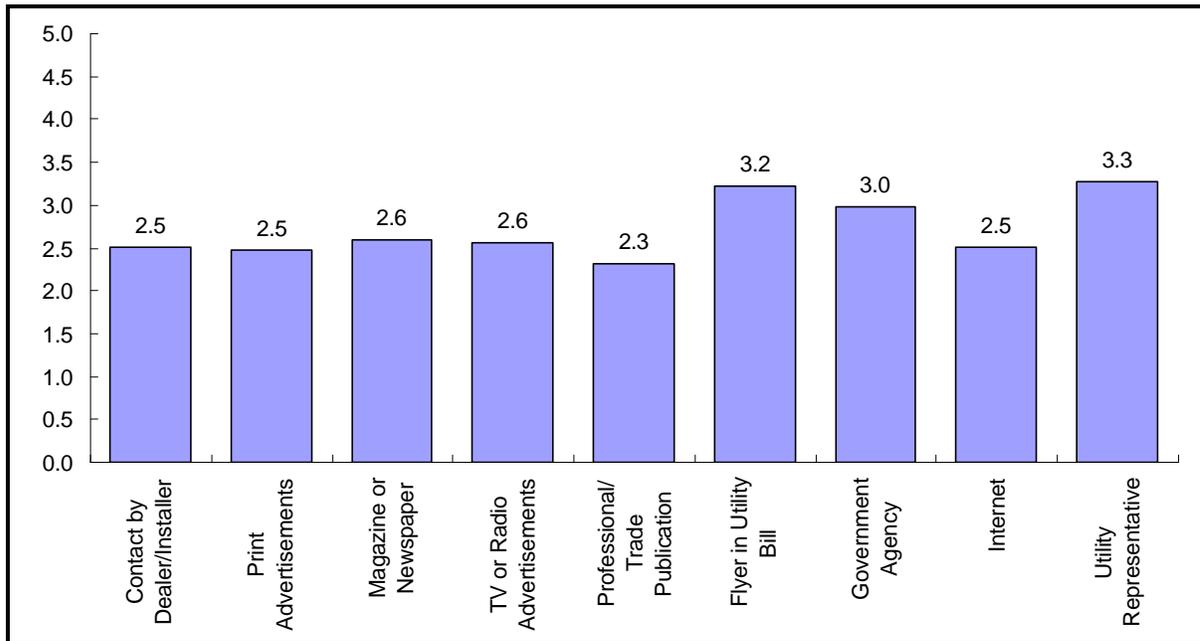
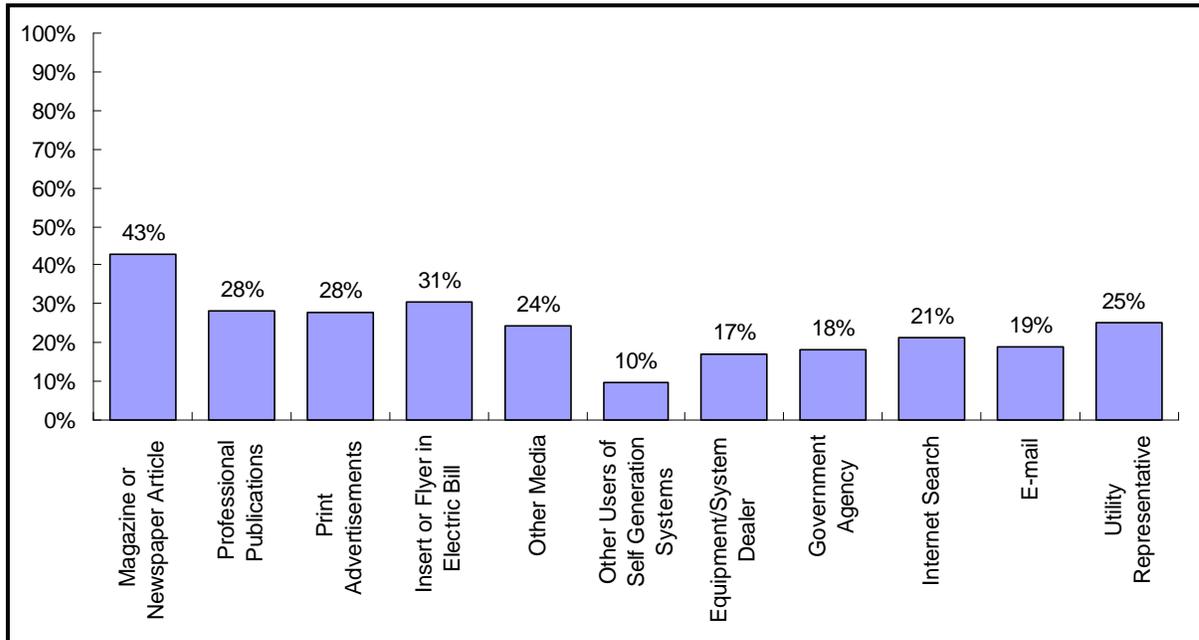


Figure 5-27 presents a summary of the how nonparticipating host customers who were already aware of the SelfGen Incentive Program learned about the program. The most common methods include the following:

- Magazine or newspaper article,
- Insert or flyer in electric bill,
- Professional publications,
- Print advertisements, and
- Contact by a utility representative.

Figure 5-27: How Nonparticipant Host Customers Learned About the SelfGen Incentive Program



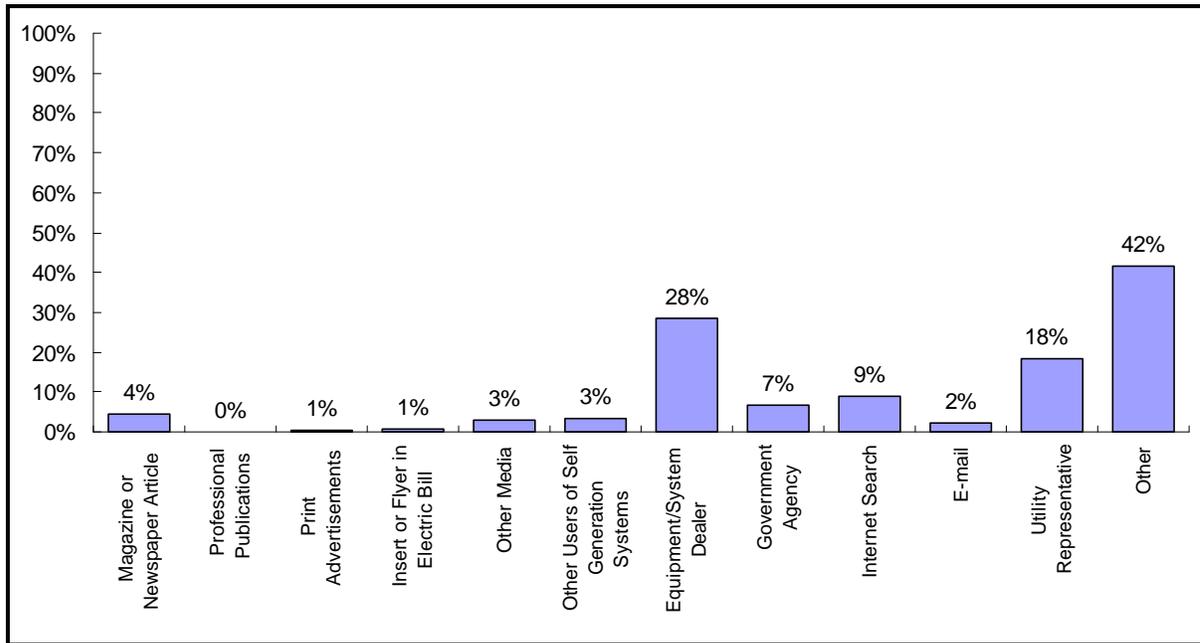
Interestingly, although their behaviors are not changing and they are not applying, nonparticipants are hearing the marketing messages via the Program Administrators’ media-related marketing activities, such as e-mail notice or advertisement, bill inserts, magazine or newspaper articles, other media (e.g., television, radio, etc.), print advertisements, and/or professional publications. Their failure to apply to the program defeats the goal of the awareness campaign to generate more interest and more applications. If the Program Administrators develop a wide-scale marketing campaign, it is paramount that a message be created that will resonate and encourage a change in consumer behavior along with increasing awareness.

Host Customers Applicants

To better understand how host customer applicants learned about the programs and the channels that most effectively communicate information about the SelfGen Incentive Program, host customers were asked to identify their sources of information about the program.

Figure 5-28 presents how host customer applicants learned about the SelfGen Incentive Program. As shown, host customers find out about the program most often through manufacturer’s or utility representatives. In addition, a large number of respondents found out about the program through other sources. For example, several wastewater treatment plants indicated that they generally had people on staff who researched such programs on a regular basis. Other avenues include through an Air Quality Management District, through contacts at business conferences, and through architects/engineers (for new construction).

Figure 5-28: Summary of How Host Customers Learned About SelfGen Incentive Program



Awareness of Host Customers Installing Photovoltaic Systems of the Net Metering Requirements

In addition to asking about how host customer applicants found out about the SelfGen Incentive Program, users of photovoltaic technology were also asked if they were “aware of the net metering requirements that are now provided by the electric utilities in California.” Of the nine Early Stage respondents who used photovoltaic technology and were surveyed, all nine (100%) indicated they were aware of the net metering requirements. Eight of the 12 (67%) Withdrawal/Suspension/Rejection respondents who used photovoltaic technology and were surveyed also indicated that they were aware of the net metering requirements. Additionally, of the 212 nonparticipants surveyed, 25% indicated that they were aware of the net metering requirements.

Third Party Applicants

Almost all of the suppliers were able to obtain sufficient information about the program, generally from utility or CPUC websites and through trade publications.

5.6 Administrator Marketing Efforts

This section discusses the Program Administrators marketing efforts. Included in the discussion are the marketing budget, marketing activities, lessons learned from the marketing of the SelfGen Incentive Program in the first year and marketing recommendations.

Marketing Expenditures and Budget

Expenditures on marketing activities represent 5.93% (\$370,582) of the original administrative budget⁹ (\$6,250,000). The amount spent by each Program Administrator in 2001 ranged from \$15,000 to \$256,000. The percentage of the administration budget allocated to marketing ranged from 0.13% to 7.5%. Dollar amounts and percentages spent on marketing vary based on Program Administrators' primary goals. For instance, one marketing strategy employed by the Program Administrators was to move as many administrative funds as possible into the incentives, electing not to spend marketing dollars. Instead, any remaining administrative dollars would be shifted into the incentives offerings.

Marketing Strategies and Activities

In an effort to promote the program, the Program Administrators conducted the following marketing activities.

- ***Workshops.*** This includes workshops, workshop flyers, workshop invitations, joint workshop with other Program Administrators, and workshops focusing on technical training (e.g., photovoltaic systems). In particular, Program Administrators have partnered on marketing and consumer education activities by speaking together at workshops on the SelfGen Incentive Program.
- ***Website Marketing.*** All Program Administrators used the web as a means to disseminate information. Application forms and resources are available on the individual websites. Program Administrators indicated that their perception is that the websites have successfully increased customer awareness. Program Administrators have received up to 10 to 12 phone calls a day from potential applicants hitting the website looking for more information. For customers who do not qualify (system not large enough), the Program Administrators will recommend an alternative program. In the process, the Administrators are able to provide good customer service.
- ***Telemarketing.*** A subset of the Program Administrators used inbound and outbound telemarketing in an effort to increase customer awareness and expedite application processing by addressing common concerns and directing potential participants appropriately.
- ***Targeted Marketing.*** According to the Program Administrators, the most successful marketing campaigns targeted distinct groups or sectors. Targeting

⁹ The administrative budget is not to exceed 5% of the total program budget.

- specific audiences like manufacturers is an effective means of increasing program awareness within the supply chain, which has an impact on program applicants. Targeted marketing programs address the goal to support continued market development of distributed generation, provide access through the existing infrastructure, and take advantage of customers' heightened awareness of electricity, reliability, and cost. Other examples of targeted marketing include account executive outreach, where the sales team wrote specific messages to their best customers and targeting large customer groups through the energy centers.
- **Press Releases.** Press releases offer an independent viewpoint of the program and often proliferate through the Internet. The press releases about distributed generation and the SelfGen Incentive Program generated attention about alternative energy distribution.
 - **Marketing Plan.** Two Program Administrators drafted a marketing plan and shared the contents during the interviews. The overall effectiveness of their marketing programs is contingent on the strategies laid out in the plan.
 - **Industry Report.** The Platt Group interviewed the Program Administrators regarding the SelfGen Incentive Program. This industry report (The Platt Retail Energy Report) will add influence to the overall program and will provide nonpartisan information to potential applicants concerned with energy trends.
 - **Incentives for Account Representatives.** An effective marketing approach included offering incentives to account executives based on project completion.
 - **Direct Mail (including E-Mail).** A quick way to reach a target audience is through direct mail, including business direct mail (BDM) and e-mail marketing. Two of the Program Administrators offer an electronic newsletter to provide continuous updates to prospective and current applicants about the SelfGen Incentive Program and distributed generation trends.
 - **Collateral Material.** The Program Administrators developed a substantial amount of collateral material including brochures, tradeshow posters, and carefully crafted presentations shared with potential applicants.
 - **Advertising (Print and Radio).** Although not the most popular method for communicating with prospective customers, radio and print ads were used that targeted specific customer groups and radio stations.

In addition to the marketing activities designed and implemented by the Program Administrators, third parties also market the SelfGen Incentive Program. According to the Program Administrators, third party suppliers have been successful at marketing the program and making the process easy for customers by having the registration form prepared.. In fact according the results of the third party survey, 62% of third party applicants mention the SelfGen Incentive Program during the distributed generation sales process with customers, either through sales presentations, literature, or as part of a sales quote.

Lessons Learned from Marketing Strategies

The goal to reduce peak demand through fully subscribed participation may conflict with the goal to increase customer awareness of available distributed generation technology and incentive programs, since some marketing dollars have been shifted to the incentive budgets. A better approach would be to 1) standardize marketing budgets to ensure equal distribution of program marketing funds or 2) collectively run a statewide targeted campaign to increase Program awareness.

Although most marketing programs implemented by the Program Administrators have increased awareness for the appropriate market, in some cases the marketing programs were ineffective in generating leads. For instance, one event targeted the academic community and although a great deal of information was shared, the number of leads generated reportedly did not justify the cost of the event.

The lack of adoption of Level 1 fuel cells and Level 2 fuel cells with non-renewables indicates a potential issue with the overall goal to have fully subscribed participation in the SelfGen Incentive Program regarding total installed capacity. The issue with fuel cells could be partially due to the lack of marketing support directly focused on this technology. Although increased marketing will likely improve awareness, in order to increase actual adoption of the technology, the barriers related to installed costs, perceptions of fuel cell reliability and long-term maintenance risk must be addressed in the marketing activities.

Since the SelfGen Incentive Program does not apply to all nonresidential customers, mass marketing through utility bill inserts and radio advertisements may be less effective than targeting the appropriate audience. For instance, in some cases, Program Administrators directed their staff to cold-call manufacturers of wind and photovoltaic systems. They discovered that the photovoltaic manufacturers are more receptive to the SelfGen Incentive Program than are the wind turbine manufacturers. By continuing to follow up with wind manufacturers and distributors, Program Administrators can potentially generate more interest from the wind industry even though the wind resource availability, land-use restrictions and Incentive Level 1 minimum size of 30 kW will clearly limit applicability in many cases.

Although some of the Program Administrator marketing efforts clearly yielded positive results, there is room for improvement based on feedback from third party applicants. In particular, third party applicants indicated that they are not seeing the effect of the current administrator's marketing efforts. According to survey results, 54% of third parties were generally dissatisfied with the degree to which the Program Administrators were publicizing the program.

Summary of Administrator Marketing Recommendations

The following recommendations could improve awareness and, ultimately, increase the number of SelfGen Incentive Program applicants.

- **Increase utility account representative involvement** with the SelfGen Incentive Program, possibly following the model created by one Program Administrator to include incentives for account representatives based on project completion and number of kW installed.
- **Improve internal communication** and awareness of the Program within the sponsoring utilities.
- **Continue to educate third party consultants/retailers/distributors/system integrators** via workshops on the SelfGen Incentive Program, providing information to further increase awareness of the program. Program Administrators should continue to focus marketing efforts on third parties, creating more packaged information and guidelines for consultants/retailers/ distributors. However, by focusing efforts on third party distribution of program literature, Program Administrators may appear to show a preference to certain parties. By increasing the reach of the third party marketing efforts and including a wide range of supply channel participants, the Program Administrators can avoid this issue.
- **Increase global marketing** via direct mail and advertising to increase nonparticipant awareness of the SelfGen Incentive Program.
- **Strengthen marketing messages** so that nonparticipants hearing about the program will be more apt to apply. This may require better targeting of marketing efforts.

Some ideas mentioned by third parties for marketing the program included holding more program information workshops and more print and broadcast advertising. Others suggested that utility customer account executives/representatives promote and/or advise potential host customers regarding program-related opportunities. The Program Administrators indicated that the account representatives do in fact promote the program; however, additional effort may be required to generate more educated interest from customers.

5.7 Barriers to Program Participation

There are several types of project implementation barriers that the participant and nonparticipant surveys address, including technical, market, regulatory, and program administrative. Responses from these groups are explored here to better understand these barriers to participation in the program. Common barriers prohibiting participation in the SelfGen Incentive Program include the following:

- **Capital Constraints – Too Expensive.** Despite the goal to lower project implementation costs through greater incentive levels, self-generation project cost is still an issue with many consumers.
- **Regulatory Uncertainty.** A number regulatory issues are affecting program participation, including uncertainties in future retail rates/structures and the ongoing developments at the CPUC regarding standby charges and system exit fees.
- **Information Availability.** Lack of needed consumer information indicates the failure of necessary consumer education and program marketing support.
- **Not Aware of Technology or Program.** Lack of customer awareness will ultimately impact the Program Administrator’s ability to reduce peak demand and generate fully subscribed participation in program.
- **Electricity is a Minor Cost.** For some small commercial/industrial customers with low energy costs, the SelfGen Incentive Program may not result in a financially viable solution. Other programs such as the CEC’s Buydown Program cater more towards small energy producers. However, one of the Program’s goals set forth indicates the need to provide support for smaller consumers, although the minor energy cost issue can defeat this goal.
- **No Interest.** The issue with participation in the program is related to the goal to develop appropriate incentives and maximize use of existing consumer awareness. If the consumer is not aware that reducing peak energy use and peak demand can positively impact their operating financials, they would not want to participate in the program.
- **Too Difficult to Implement.** By streamlining processes and making access to distributed generation technology easier, this common barrier can be avoided; ultimately supporting the goal to ensure that delivery channels and infrastructure are supportive.
- **Time Adequacy.** An issue with project development schedules and program requirements reveals that the program may fall short on the goal to provide adequate lead time for key program milestones.
- **Concern about Business Disruption.** Business interruption is inherent with any large project. The need to understand why the result of installing a distributed generation project will help offset costs, reduce peak demand, and ultimately benefit the customer is necessary to offset any disruption.

Project development decision makers need better tools for assessing their project impacts and financial analysis. Variability in rate schedules, exemptions for certain technologies and their sunset date, and the uncertainty of future gas/electricity prices all will limit consumer adoption of self-generation technology in California. Although sales tools on ROI are available for distributed generation, they tend to focus on one manufacturer. Hiring an independent project financial analyst to evaluate host customers may result in beneficial

investment in distributed generation equipment and projects. Additionally, recommending that customers be fully aware of pending regulatory proceedings and legislation and the subsequent impact on self-generation technologies will help ensure a high degree of informed awareness that will impact the decision making process.

The required *first cost* involved with implementing self-generation projects may limit participation. Many customers believe the generation systems are too expensive. The lack of strong financial feasibility combined with a downturn in the economy is a common barrier. The high capital costs inherent in distributed generation projects and limited available financing further restricts adoption. If electricity is too small of a cost, the customer will not reap the required benefits of their investment.

There is a perception by some consumers that the energy crisis is now over, and therefore the interest level in implementing a distributed generation project is low. The goal to take advantage of customers' heightened awareness of electricity, reliability, and cost may not be as relevant, given the perception that the crisis is at least momentarily over. More emphasis is needed from the Program on long-term planning and the importance of preparedness, in the event another energy crisis strikes the west. A common perception associated with distributed generation projects is that the systems themselves are unreliable. Gas and electric rate uncertainty coupled with the lack of customer awareness about the increased reliability of distributed generation technology in recent years may positively impact adoption rates.

Finally, the projects are construed as being too difficult and/or timely to implement. Applicants who are not aware of the typical interconnection schedule may be more frustrated than others. Waste heat recovery challenges for Incentive Level 2 and 3 projects may yet present future barriers during the installation and system interconnection process. The complexity of distributed generation projects limits consumer adoption. By continuing to improve application forms and information resources available to prospective customers, the Program Administrators will help to simplify the process of implementing distributed generation projects and minimize the effect of these barriers upon adoption rates.

There are specific barriers applicable to each SelfGen Incentive Program technology. Some common technology barriers include the following.

- **Wind Turbines.** Participants must be tied to an existing electric meter with adequate load and this can make the application difficult. In addition, a rural environment is typically required and wind energy resource constraints further hinder the ability to implement projects greater than 30 kW.
- **Fuel Cells.** Technology capital and perceptions of long-term maintenance costs. Also end-user thermal process applicability constraints with heat recovery.

- **Small Gas Turbines.** Process constraints (due to plant efficiency level requirements on heat recovery causing constraints).
- **Microturbines.** Process constraints (due to plant efficiency level requirements on heat recovery causing constraints).
- **Internal Combustion Engines.** Process constraints (due to plant efficiency level requirements on heat recovery causing constraints).

There were very few issues raised by advanced stage participants or third parties regarding barriers to program participation. The comments about program complexity seemed to pose some difficulties, but did not rise to the level of “deal-breakers.”

One potential major issue mentioned by a fuel cell manufacturer was the requirement that the system be *commercially available*, which was interpreted to mean that it had to have been operating successfully in an industrial/commercial application for at least one year. This supply channel respondent felt that this requirement impeded innovation and new technologies. However, it also protects the consumer from undue risk associated with very new technology applications, which consumers would purchase as a commercial warranted product.

Another reported problem was that retrofit applications are constrained to the past 12 months of historic load at the facility. This limitation could have negative implications, including the following:

- System equipment availability might require that a “smaller than optimal” system be installed because not all sizes of internal combustion engines are available, and
- The past 12 months of electric usage history might not reflect “typical load conditions,” especially during low points in the host customers’ business cycle.

In addition, the Program’s useful heat recovery requirements limit the applicability of the Level 2 and 3 systems to process thermal loads whose heat requirements closely follow their generation requirements, or to situations in which the thermal energy requirements are almost continuous.

5.8 Effectiveness of Program Design upon Removing Market Barriers

Implementing a distributed generation incentive program is a multifaceted undertaking and this complexity may limit market potential. The waste heat recovery requirements of the program, for example, are reportedly difficult to meet in many building-specific applications. The requirements ensure deployment of clean self-generation technologies with low and zero

operational emissions, consistent with the AB970 ruling. However, these requirements sometimes limit an applicant's ability to implement a project. In some cases, waste heat recovery requirements are met, but the project does not meet the electricity needs of the customer. However, the waste heat recovery requirements further support the goal of giving preference to new (incremental) renewable energy capacity.

In an effort to reduce market barriers, the Program Administrators created supplemental information to increase awareness about the program, how to meet waste heat requirements, and how to streamline the application process. Subsection 5.3 provides details about the newly developed waste heat recovery worksheet and other process improvements designed to remove these market barriers.

The inability for consumers to access enough information about self-generation technologies, a common market barrier, may result in reduced system quality. According to several administrators, multiple bidders must be required on these projects. Competition will help transform the market and offer more consistent products to consumers through quality checks and balances. The wide variety of implementation costs for similar equipment currently indicates potential sole sourcing. Applicants need to look at actual costs and impacts compared with the self-generation system costs. Currently, the SelfGen Incentive Program may not be achieving the maximum peak load reduction due to the quality (or lack thereof) of systems. By including a requirement for multiple bidders on projects, applicants will have a better chance of reaping optimal benefits from their distributed generation systems and ultimately reduce peak load. Improving the system quality will enhance the potential impact on the grid, further supporting the goals to provide value to the electricity system, support successful projects installed with sufficient performance, and ultimately reduce peak demand.

Another common barrier listed in subsection 5.6, financial constraints, can be resolved by using an incentive payment to offset initial costs. Performance-based incentives may further compel consumers to participate in the program.¹⁰ Once the adoption rates for distributed generation have increased substantially, the costs for systems and implementation are expected at some point to fall.

Supply Channel Perspective

The program is generally regarded as effective in promoting self-generation technologies and creating an incentive for hosts to consider these systems. In the case of photovoltaics, the SelfGen Incentive Program is critical to the economic viability of the installations. Almost without exception, Level 1 generation systems would not be considered feasible without the

¹⁰ Note that the CPUC considered using a performance-based incentive and decided against it in their CPUC Decision 01-03-073, Section 4.6.2.

program's incentive. This perception is also reportedly true of Level 2 nonrenewable fuel cell systems.

In the case of internal combustion engines, many suppliers claimed that their systems are generally economic without the incentive, with projected payback periods on the order of two to five years. However, the incentive payments are still important in encouraging hosts to consider self-generation and use of heat recovery at their site. Host customers are inherently resistant to becoming involved in the energy business, due to the added risks, required expertise and the time they must spend running their existing primary business. The demonstrated uncertainty in the electricity markets and, with the related regulatory uncertainty, consumers have raised the bar on their effective energy investment hurdle rates.

5.9 Effectiveness of Program Design Upon Leveraging Market Incentives

The SelfGen Incentive Program currently offers a one-time cash incentive in an effort to reduce peak demand on the electric grid. According to the Program Administrators, about half of them thought this was the best approach to reduce peak demand. The current approach seems to address high capital costs. The high incentive levels for photovoltaic and wind systems are in accord with the goal to give preference to new renewables. In addition, the incentive levels are designed so that a maximum number of low or zero emission technologies are encouraged and deployed. However, it is not very clear if a higher incentive level for fuel cells would increase participation in the program. If another method of fund distribution were employed, applicants would require larger loans and would need to front more money initially. The one-time cash incentive could change to include a one-time initial cost payment, as well as ongoing payments for assurance of operation. The current incentive could be expanded to include a commitment of consumption, with an ongoing payment to ensure systems remain online and operational throughout the warranty period.

An alternative approach would be to implement a performance-based peak production incentive.¹¹ According to its proponents, this incentive design would more effectively accomplish the SelfGen Incentive Program's goal of reducing peak demand and would more effectively increase the awareness of customers because of greater overall impact. Sellers of the systems are not evaluated based on peak demand reduction and whether systems run at the rated capacity. The cost of equipment varies, and although the initial cost may be lower, the actual peak demand, reductions will vary according to system installed. By offering an incentive based on performance, higher quality systems and greater potential peak load

¹¹ Note that the CPUC considered using a performance-based incentive and decided against it in their CPUC Decision 01-03-073, Section 4.6.2.

reduction could be achieved since manufacturers would be evaluated more deliberately regarding the efficiency and operability of their equipment.

The cost to monitor incentives based on actual peak reduction may be too high, however, to justify this change in the incentive structure. Therefore, to affect the greatest potential market, it is recommended that the current incentive structure of a one-time cash payment be continued. Once the adoption rate for distributed generation improves, alternative incentive structures could be explored.

Incentive Budget by Category

The SelfGen Incentive Program currently allocates one-third of the incentive budget to each technology level. Program Administrators are able to move funds freely from nonrenewable categories to the Level I renewable category. Budget reallocation from renewables to nonrenewables requires approval from the CPUC. This is a reasonable policy since it is consistent with legislation AB970, which requires that utilities give preference to new (incremental) renewable energy capacity.

Three-fourths of the Program Administrators agree that the allocation approach across categories is a fair way to distribute funds and offers flexibility in fund reallocation. Opponents of the approach believe that certain categories, such as fuel cells operating on renewable fuel, are not yet viewed as a viable commercial technology. Administrative bottlenecks involved with shifting funds from renewables to nonrenewables may infringe upon the goal to reduce load. In fact, some applicants were turned away because the budget limitations within Level III had been met. Meanwhile, Level 2 funds had not been exceeded. These funds could have been transferred if the administration had been handled more efficiently.

Some Program Administrators agree that Level 1 and Level 3 incentives are too high. However, most Program Administrators agree that Level 2 incentives are too low to move the market for fuel cells operating on non-renewable fuel. There is no indication of free ridership with Level 1 technologies, as reported during this first process evaluation. However, it appears that installed costs for photovoltaic systems greater than 30 kW may have increased since the inception of the SelfGen Incentive Program. Comparison of eligible installed costs prior to 2001 under the Buydown Program (with maximum incentive levels of \$3.00 per watt) indicates that medium and large systems averaged less than \$8.00 per watt. Current data from the program indicate that photovoltaic systems eligible costs are near \$8.90 per watt.

In addition, the Program Administrators indicated a need to understand the lifecycle costs inherent in the different technologies and how the incentive levels were determined. In

addition, alternative technologies such as process steam, geothermal steam, small hydro, and turbo expanders are currently excluded and may deserve consideration. An explanation regarding why these specific technologies were selected for the SelfGen Incentive Program would benefit prospective customers, suppliers, and administrators.

5.10 Summary of Major Process-Related Findings and Recommendations

This subsection summarizes the major process related findings and recommendations of this research. The areas of assessment addressed in the first operational year of the program include the following:

- Effectiveness of joint delivery implementation approach,
- Program operational efficiency issues,
- Program acceptance and satisfaction,
- Program awareness,
- Administrator marketing efforts,
- Barriers to program participation,
- Effectiveness of program design upon removing market barriers, and
- Effectiveness of program design upon leveraging market incentive.

Effectiveness of Joint Delivery Implementation Approach

The major finding with the implementation approach is that regional administration of the program works better than a centralized approach. There is agreement on this across Program Administrators, supply channel program applicants, and third party service providers.

Several improvements have been suggested to improve the joint delivery approach.

- Create a centralized web-based application system for all Program Administrators to use that will help to automate common processes and streamline the application process.
- Create a Program Administrators' forum to share and review resources and administration approaches.
- Utilize a central call center to answer common questions and concerns, in particular, screening applicant concerns before speaking to a Program Administrator.
- Push for consistency in application requirements (e.g., interconnection agreements).

Program Operational Efficiency Issues

Discussions were held with host customers, third-party applicants, and Program Administrators on five specific issues relating to the program's delivery and operational efficiency.

- Familiarity with and clarity of the applicant materials and instructions,
- Responsiveness of Program Administrators to applicants' questions,
- Whether any lack of responsiveness to questions by Program Administrators or third parties lead to delays in the application process,
- Adequacy of the SelfGen Incentive Program application 90-day and one-year requirements, and
- Level of ease/difficulty for system installation and for meeting application milestones.

Familiarity with and Clarity of the Applicant Materials and Instructions

Most host customers review the application materials. Even those who claim to be uninvolved more often than not take time to review the application and instructions. The percentage of host customers who found the forms and instructions to be clear ranged from a low of 64% for the uninvolved applicants to a high of 91% for the involved applicants.

Host customers suggested three notable improvements to the application process.

- Creation of a checklist of requirements for each stage of the application process,
- Simplify application materials, and
- Simplify application instructions.

Third party applicants are assumed to be familiar with the application material and generally perceived it to be clear and satisfactory. There was some difficulty, mostly for the internal combustion engine systems, at the beginning of the program regarding the eligibility of certain heat recovery systems for cooling. This issue was clarified in February 2002 under Decision 02-02-026.

Program Administrators conveyed that the most time-consuming part of their jobs is educating interested consumers and applicants. Because of this, some of the Program Administrators made changes to help applicants complete the forms. These included reservation checklists, answers to frequently asked questions, applications instructions, and a waste heat recovery worksheet. In addition, Program Administrators suggested a number of potential additions to the application materials, most notably a step-by-step guide in understanding electrical terms (watts/kW/MW) and how to interpret utility bills. Program

Administrators also agreed with host customers that the application process and forms be simplified to save time and expedite applications.

Responsiveness of Program Administrators to Applicants' Questions

There is one clear finding on this issue: the overwhelming response by host customers is that the Program Administrators were responsive and provided satisfactory answers to program-related questions.

Does any lack of Responsiveness to Questions by Administrators or Third Parties lead to Delays in the Application Process

Very few host customers indicated that there were any unnecessary delays caused by either the third party or the Program Administrators or both. This was also the case for third party applicants. Of the few host customers who indicated they experienced delays, it was usually due to the difficulty in obtaining interconnection agreements with the utilities. In addition, it was suggested that one person in each Program Administrator's office be assigned as a "customer service representative" to address all application process questions.

Adequacy of the SelfGen Incentive Program Application 90 day and One year requirements

More than half (55%) of Early Stage respondents indicated that the 90-day proof of project advancement requirement was too stringent. Those with internal combustion engines and fuel cells reported the greatest difficulty with this requirement. In contrast, only 23% of Withdrawal/Suspension/Rejection respondents indicated that the 90-day deadline was not sufficient. This is consistent with the 10% of the same group indicating that their application was withdrawn/suspended/rejected because of not meeting the 90-day deadline.

Contrary to the 90-day deadline, the majority of applicants believe the one-year equipment installation requirement to be sufficient.

Third party applicant's responses to the 90-day deadline were varied both among the incentive categories and among the application stages. Notably, internal combustion system applicants found this requirement very difficult to meet for a variety of reasons. In contrast, the third party applicants generally believe the one-year deadline to be sufficient. Time constraints were generally perceived to be related to administrative requirements.

Program Administrators, conversely, overwhelmingly support the 90-day deadline because it expedites the process and eliminates unrealistic applications. Also in contrast, the most Program Administrators believe that some applicants (schools and governments) need more than one year to have equipment installed due to the time required for these segments to obtain internal approvals.

Level of Ease/Difficulty for System Installation and for Meeting Application Milestones

Early Stage and Advanced Stage respondents indicated that the top two most difficult milestones to reach were obtaining interconnection agreements and air emissions permits. Because they were not as advanced as their counterparts, Withdrawal/Suspension/Rejection respondents indicated that providing detailed cost estimates and selecting a manufacturer were the two most difficult.

Program Administrators agreed with host customers in their perception that interconnection agreements presented difficulty. However, Program Administrators were more extreme in their perceived judgment of the degree of difficulty of several milestones. Program Administrators placed more difficulty on waste heat recovery calculations and less difficulty on obtaining air emission permits than host customers.

In addition to areas of difficulty, survey respondents were asked about the likelihood of their projects being completed. Early Stage respondents were very optimistic that their systems would be installed. Interestingly, more than half of the Withdrawal/Suspension/Rejection respondents indicated that their projects are still likely to be installed.

Program Acceptance and Satisfaction

Program acceptance and satisfaction is reasonably high across all host respondent groups. However, the third party applicants responded slightly less favorably than the host respondents did.

Program Awareness

Host applicants appear to learn about the SelfGen Incentive Program via a third party distributor or directly from a utility representative, rather than through Program Administrators' marketing activities. However, the third party applicants indicated concern regarding the overall effectiveness of the Program Administrators' marketing efforts, when in fact they are the main source of marketing for the SelfGen Incentive Program, according to the Program Administrators and host applicants.

Nonparticipants are learning about the SelfGen Incentive Program from slightly different sources of information than the other applicants. Nonparticipants are more apt to find out about SelfGen Incentive Program via Program Administrators' marketing activities, yet are not changing their behaviors and applying to the program. It appears that customers working with a third party may have an easier time with the application process.

The current marketing programs do not appear to be resonating as clearly as they could, with the exception of the third party marketing, utility representative custom consultation with

customers, and workshops on self-generation. More support from the Program Administrators by way of workshops, providing literature to third parties that can be shared with customers, involving utility account representatives, and rolling out a wide-scale marketing campaign will ultimately increase program awareness.

Administrator Marketing Efforts

The Program Administrators use a number of marketing mediums in their efforts to fully subscribe the program, including the following:

- Workshops,
- Web site marketing,
- Telemarketing,
- Targeted marketing,
- Press releases,
- Marketing plans,
- Industry report,
- Account executive incentive,
- Direct mail,
- Collateral materials, and
- Print and radio advertising.

The degree of marketing has varied across the Program Administrators. The total dollars allocated to marketing efforts has ranged from 0.13% to 7.5% of Program Administrator costs. This variation results from the primary goals of the Program Administrators.

Although most of the marketing programs implemented by the Program Administrators have resulted in increased awareness for the appropriate market, in some cases the marketing programs were ineffective. Some events have not been as successful because there was a lack of actionable leads. To increase actual adoption, the barriers related to fuel cell reliability and risk aversion must be addressed. Increased marketing or increased incentives will help drive the market, and lowering the costs and improving the ease of installation will help reduce market barriers further.

Mass marketing, such as utility bill inserts and radio advertisements, may not be as effective as other methods in targeting the appropriate audience since the SelfGen Incentive Program does not apply to everyone. The SelfGen Incentive Program message resonated more effectively with equipment suppliers than with consumers. The third party marketing activities support the goal to use an existing network of service providers and customers to provide access to self-generation technologies quickly.

Several recommendations may improve awareness and increase the number of applicants.

- Increase utility account representative involvement with the SelfGen Incentive Program.
- Improve internal communication and awareness of the program within utilities.
- Continue to educate third party distributors via workshops on the SelfGen Incentive Program.
- Increase global marketing via direct mail and advertising to increase nonparticipant awareness of the SelfGen Incentive Program.
- Strengthen marketing messages so that nonparticipants hearing about program will be more apt to apply.

Program Administrators need to implement marketing activities that will affect the number of applications and ease the application process. By focusing more energy on increasing the awareness of utility account executives and third party distributors, the Program Administrators will be able to leverage their existing network with a method of communication that is already successful.

Barriers to Program Participation

Common barriers prohibiting participation in the SelfGen Incentive Program include the following:

- Capital constraints,
- Lack of available information,
- Lack of customer awareness,
- Electricity is a small cost,
- Lack of consumer interest,
- Too difficult to implement,
- Inadequate lead-time for key milestones, and
- Concern about business disruption.

There are specific barriers for each SelfGen Incentive Program technology.

- ***Wind.*** Participants must be tied to a meter and this makes the application difficult. In addition, resources and a rural environment are required, further hindering implementation.
- ***Fuel Cells.*** Process constraints (due to efficiency level requirements causing constraints).
- ***Small Gas Turbines.*** Process constraints (due to efficiency level requirements on heat recovery causing constraints).

- **Microturbines.** Process constraints (due to efficiency level requirements on heat recovery causing constraints).
- **Internal Combustion Engines.** Process constraints (due to efficiency level requirements on heat recovery causing constraints).

Effectiveness of Program Design upon Removing Market Barriers

The SelfGen Incentive Program is designed to address a number of these market barriers through its program design and associated Administrator marketing efforts. It cannot effectively address such barriers as relatively small electricity costs, potential business disruptions, or future regulatory uncertainty. The assurance of an upfront incentive will 1) reduce the need for project equity and/or debt and increases the likelihood that capital can be obtained and 2) effects consumer interest in distributed generation technology on both the demand-side and through available supply channels.

Implementing a self-generation incentive project is a complex task. This complexity may limit market potential. The requirements ensure deployment of self-generation technologies with low and zero operational emissions, consistent with AB970 ruling. However, the requirements sometimes limit an applicant's ability to implement a project.

In an effort to reduce market barriers, Program Administrators have created supplemental information to increase awareness about the program, how to meet useful waste heat recovery requirements, and how to streamline the application process.

Financial constraints can be resolved using an incentive payment to offset initial costs. In some instances, the incentives provided by the program are critical to the economic viability of the installations. The program is generally regarded as effective in promoting self-generation technologies and creating an incentive for hosts to consider these systems. Some suppliers claimed that their systems are generally economic without the incentive. However, the incentive payments are still important in encouraging hosts to consider self-generation at their site.

Effectiveness of Program Design upon Leveraging Market Incentive

The SelfGen Incentive Program currently offers a one-time cash incentive in an effort to reduce peak demand on the electric grid. The current approach is focused on addressing high capital costs and lack of consumer interest in the self-generation option. In addition, the three-tiered incentive level structure is designed to encourage the deployment of low or zero emissions technologies. The program guidelines do not allow other state-level distributed generation program incentives funds, such as the CEC's Buydown Program, to be added to the SelfGen Incentive amount for any applicant funded through the Program. This

requirement can ensure that projects continue to require a substantial investment by the customer or system owner.

However, in the case of local, federal, or other private sources of market incentives, these funds are simply deducted from the eligible system costs in determining the Program incentive. This interactive incentive approach with non state-funded Programs increases the total potential funding received by eligible projects, which may have a positive deployment impact on distributed generation technologies with higher capital costs or perceived technical risks (e.g., fuel cells, photovoltaic, and small wind turbines). If such incentive funding is available for the lower capital cost (i.e., Level 3) distributed generation technologies, they will typically not require these added incentives from other programs in order to be considered economic by project developers/owners. Implementing this revision would however, complicate, and not simplify the program application process thus providing further potential confusion by host customers and third party applicants.

Given the self-reported level of Incentive Level 3 free ridership by third parties and that the vast majority Level 3 incentives were based on eligible system cost,¹² the issue of whether the Level 3 incentive (\$/watt and % of eligible cost) should be reduced needs to be addressed through further study. This assessment should be based upon reported implementation costs, self-reported project developer investment hurdle rates and by tracking the success of these first year projects through the second program year. As the self-generation market increases in size over time, this action will have an impact on the total leveraging of the program's available funds.

Likewise, although there was no reported free ridership with the Level 1 incentive applicants, it is clear that medium- and large-scale photovoltaic eligible project costs have increased over the past several years since the CEC Emerging Buydown incentives were raised from \$3.00 to \$4.50 per watt. Given the lack of other reported drivers and a rapidly expanding market, this noted increase in installed costs in the larger photovoltaic systems may well be a direct result of the increase in available program incentives. Reducing the Level 1 incentives slightly may have the longer-term impact of further leveraging the program funding for Level 1 renewable technologies. In addition Level 2 (and Level 1 – Fuel Cells) incentives appear be too low to impact the market, although it is not clear whether consumer perception of other *technology risk factors* simply outweigh the benefit of the current incentive levels. If this technology commercialization/consumer perception is the key issue, then increasing the program incentives for fuel cells will have little effect on Incentive Level 2 program participation. It is recommended that further analysis be performed by the CPUC Energy

¹² According to the Program Administrator's statewide 2001 program data, 94% of the active internal combustion engine applicants and 87% of the active microturbine applicant incentives are based on eligible system cost.

Division to determine the optimum incentives for the program, given its stated goals and objectives.

6

Other Incentive Program Participation

6.1 Introduction

Distributed generation projects in California may be eligible for support from a variety of programs established by federal, state, utility, or local authorities. Individual self-generation program projects may receive funding support from multiple programs. For the Other Program Participation Evaluation Task, the main objectives are to compile participation information for other distributed generation support programs and to summarize crossover between these programs and the CPUC Self Generation Incentive Program (SelfGen Incentive Program).

Complete information related to program participation is valuable for two primary purposes. First, information concerning receipt of support from other programs is necessary to determine compliance with program guidelines. Second, future benefit-cost analyses of the program will require information necessary to allocate costs and benefits to stakeholder groups. This section begins with a discussion of background issues related to other programs. Next, the range of possible programs affecting distributed generation projects is described. Finally, other programs that SelfGen Incentive Program participants have been involved with are summarized.

6.2 Background

A key element of the SelfGen Incentive Program's design is a schedule of incentive magnitude caps expressed in terms of \$/watt or percentage of total project costs. The intent of the program is for qualifying distributed generation projects to be supported just up to these caps, regardless of whether funding is received from multiple programs. This intent is clearly delineated in Section 3.4.3 (Other Incentives and Rebates) of the July 2, 2001 Edison version of the Self-Generation Incentive Program Handbook. The Handbook states that "the combined incentives received from this and any other incentive program offered by local, state or federal government entities or utilities cannot exceed the incentives offered through this program."

To facilitate adherence to the total incentive limits, SelfGen Incentive Program participants are required to disclose information about any other incentives they may be receiving. A statewide compliance database was developed for the program and is being used to support these efforts. The statewide compliance database contains participation information from the four SelfGen Incentive Program Administrators, as well as select participant information from the CEC's Emerging Renewables Buydown Program. To satisfy the requirements of the Other Program Participation Evaluation Task, these data were combined with information resulting from interviews of program participants and with participation information for other programs, including the Department of Defense's Climate Change Fuel Cell Program, the Air Quality Management District's Microturbine Giveaway Program, and several statewide programs funded by Assembly Bills 970, 29x, and SB 5x.

During program implementation, attention is focused on initial installed costs and incentives that reduce those costs. In the future, more complete information may be required to complete benefit cost analyses. While the details of benefit/cost analysis methods for the SelfGen Incentive Program have yet to be finalized, information needs may extend into a variety of areas affecting the allocation of project costs. Other types of programs for which participation information may be required by cost/benefit analysis methods include those related to taxes and financing costs.

The CPUC's existing benefit/cost analysis methodology predicted a B:C ratio of 10 for the SelfGen Incentive Program. The methodology, input assumptions, and supporting forecasts are slated for review and revision by an independent consultant. The consultant's report is scheduled to be delivered no later than December 31, 2002. Results of this work will be combined with information from the SelfGen Incentive Program and other distributed generation programs in order to calculate estimates of actual program benefit/cost ratios.

6.3 Identification of Other Potential Incentive Programs

An Internet review was used to identify and categorize incentive programs into three broad areas, namely federally funded, state funded, and utility and/or local government funded incentive programs. It is important to note that many of these programs provide rebates on the purchase, construction, and installation costs of renewable energy equipment. These programs clearly overlap with the SelfGen Incentive Program and, therefore, combined incentive payments should not exceed the incentives offered by the SelfGen Incentive Program.

In addition to grant and buydown programs, there are a number of programs that encourage investments in renewable energy through investment tax credits, accelerated depreciation, or subsidized financing terms. While program participants are not required to disclose

participation in these types of programs as a condition of program eligibility, information related to taxes and financing may be necessary to complete a benefit/cost analysis of the program.

Below is a listing and brief description of each program identified as having potential overlap with the SelfGen Incentive Program.

Federally Funded Incentive Programs

The following programs are federally funded or have been federally approved.

- **Climate Change Fuel Cell Rebate Program.** Implemented by the Department of Defense, the Climate Change Fuel Cell Rebate Program is designed to expedite the market introduction of fuel cell systems. The program provides up to \$1,000 per kW (not to exceed one-third of the total installed cost). While priority is given to systems sited at Department of Defense sites, this is not an eligibility requirement. The program began in 1995 and funding is received annually. Funding levels have been highly variable, ranging from \$8.4 million in 1995 to \$0 million in fiscal year 2001.

Contact Information:

Website: www.dodfuelcell.com/climate/

- **Accelerated Capital Depreciation for Solar Energy Property.** This allows a five-year accelerated capital depreciation for commercial entities that invest in or purchase qualified solar energy property (i.e., photovoltaics, solar hot water, and energy storage equipment).
- **Investment Tax Credit.** Established by the Energy Policy Act of 1992, this tax credit has been extended permanently. Ten percent of the investment or purchase and installation amount of solar and geothermal energy equipment can be used as a tax credit. However, if the property is financed using subsidized energy financing, only 10% of the amount not subsidized can be used as a tax credit. The tax credit applies only for entities that pay tax.
- **Renewable Energy Production Incentive (REPI).** Established by the Energy Policy Act of 1992, this incentive is available to state and local government entities and not-for-profit electric cooperatives that started operations between October 1993 and September 2003. Participants receive 1.5¢/kWh (inflation adjusted) for the first ten years of operation (subject to annual appropriations in each federal fiscal year of operation) for electricity produced from renewable resources. Energy sources that have qualified in the past include solar, wind, landfill and sewage methane, biomass, digester gas, fuel cell, and wood waste.
- **Renewable Electricity Production Credit (REPC).** Established by the Energy Policy Act of 1992, this program extended from 1993 to December 2001. Congress did not extend the program in 2001, but it may be reconsidered in 2002.

A 1.5¢/kWh (inflation adjusted) credit is applied for wind and closed loop biomass power plants. The incentive is available to private entities that generate electricity from qualifying facilities.

- **Small Business Administration 7A Standard Small Business Loan.**

Through this program, the SBA makes loans to small businesses that have photovoltaic and solar thermal system projects with ten-year payback periods (or less). The maximum interest rate that can be charged through this program is prime + 2.75%.

Contact Information:

Website: <http://www.sbaonline.sba.gov/>

- **Small Business Administration 7A + 02 Energy Loan Program.** The SBA provides loan guarantees for up to \$750,000 or 75% of the loan amount or up to 80% of loan amounts under \$100,000 to small businesses that have photovoltaic and solar thermal system projects.

Contact Information:

Website: <http://www.sbaonline.sba.gov/>

- **USDA Rural Utilities Service (RUS).** The RUS has the authority to finance on- and off-grid renewable energy resources, particularly photovoltaic and wind powered projects. Only nonprofit utility organizations, such as electric cooperatives and public utility districts, are eligible. Individuals cannot participate in this program.

Contact Information:

Website: <http://www.usda.gov/rus/electric/renewables.htm>

- **USDA Rural Economic Development Grants and Business Cooperative Services Loans.** Under this program, up to \$400,000 can be used to establish revolving loan funds for infrastructure or community facilities in rural areas. In addition, various other types of loans are also available. An analysis of loans made in the past five years show that no California disbursements have been made—this could be a function of no applications from California for this program. Photovoltaic and solar thermal systems qualify for this program.

Contact Information:

Website: <http://www.rurdev.usda.gov/>

State-Funded Incentive Programs

The following programs are funded and/or approved by the State of California.

- **Emerging Renewables Buydown Program.** This program, which started in 1998, gives incentives of \$4.50/watt or 50% of purchase price, whichever is less for the installation of renewable energy equipment. Production of participant systems should not exceed 200% of the site's historical or current needs.

Photovoltaic, small wind (10kw or less), fuel cells using renewable fuels, and solar thermal electric systems may qualify for this program.

Contact Information:

Website: <http://www.consumerenergycenter.org/buydown/index.html>

- **Waste and Wastewater Peak Load Reduction/Energy Efficiency Program.** Approximately \$4 million is available under this program, which is designed for water system and wastewater treatment plant owners and administrators. Applications for the program are accepted until July 2002 and projects should be completed by December 2002. Incentives of \$250/kW to \$300/kW are paid for projects that reduce peak load during the summer season.

Contact Information:

Website: http://www.energy.ca.gov/peakload/water_wastewater.html

- **Solar Energy and Distributed Generation Grant Program.** This program has a budget of \$750,000 for fiscal 2001. California residents who are purchasers, sellers, owners-builders, and/or owner-developers of solar or distributed generation systems are eligible for up to \$750 for solar and battery equipment and up to \$2,000 (or 10%, whichever is less) for eligible distributed generation systems.

Contact Information:

Website: <http://www.consumerenergycenter.org/solaranddg/index.html>

- **Air Quality Management District Microturbine Giveaway Program.** This program provides microturbines to participants at no cost. The program's objective is to reduce emissions of air pollutants from backup diesel generators during electrical shortages. Fifty-three natural gas fueled 60-kW Capstone microturbines will be distributed by the program. Whereas the SelfGen Incentive Program requires heat recovery, cogeneration is an option in the Giveaway Program. This program is open only to customers in the South Coast Air Quality Management District, which comprises Los Angeles and Orange counties and parts of Riverside and San Bernardino counties.

Contact Information:

Website: http://www.aqmd.gov/tao/Microturbine_Program.htm

- **California Property Tax Exemption for Solar Systems.** Under this tax incentive, enacted in January 1999 and due for expiration in January 2006, solar systems are not subject to property tax.
- **Commercial and Institutional Financing Options.** The California Energy Commission has compiled financing-related information for commercial enterprises and institutions planning to make investments in renewable energy equipment. Financing Options Fact Sheet – Institutional Financing Options for Renewable Energy Systems (P500-01-017)

Contact Information:

Website: <http://www.energy.ca.gov/renewables/marketing/>

- **Solar and Wind Tax Credit.** This credit runs from 2001 to 2006 and is applicable for photovoltaic and wind systems with peak generating capacity of less than 200 kW. The tax credit is 15% (or \$4.50/watt, whichever is less) of purchase and installation costs between 2001 and 2004, and then drops to 7.5% between 2004 and 2006.
- **California Communities' CaLease Finance Program for Alternative Energy.** Local governments and school districts in California are eligible for this program, which allows leases of at least \$250,000 to be funded with a fixed tax-exempt rate of approximately 5.35% to 5.85% for a ten-year lease term.
- **Rural Alliance, Inc. Alternative Generation Financing.** Offers low cost capital for alternative energy generation such as microturbines, solar photovoltaic, solar thermal, wind energy, and fuel cells. Current rates are approximately 5.15% to 5.9% for terms up to 20 years and a minimum finance amount of \$10,000.

IOU, Local Utility, and/or Local Government Funded Programs

The following programs are predominantly funded and/or approved by IOUs, local utilities, and local governments.

- **Burbank Water and Power.** Business customers are eligible for \$3/watt up to a maximum of \$9,000 for the purchase and installation of photovoltaic systems.

Contact Information:

Website: <http://www.burbank-utilities.com/businessrebate.htm>

- **Los Angeles Residential and Commercial PV Buydown Program.** Customers with photovoltaic systems that produce at least 300 watts but not more than 100% of customers' annual power needs are eligible for this program. Participants must remain connected to the LADWP grid and the program reimburses \$6 million in its first year and \$8 million per year for the next four years (2001 to 2005). Incentives are a maximum of \$3/watt for systems manufactured outside the city of Los Angeles and \$5/watt for systems manufactured inside the city of Los Angeles. In addition, the maximum payment per site is \$1 million.

Contact Information:

Website: <http://www.greenla.com/>

- **Pasadena Solar Power Installation Rebate.** Commercial and residential customers with photovoltaic systems are eligible for \$5/watt or \$10,000 incentive based on available funding.

Contact Information:

Website: <http://www.ci.pasadena.ca.us/waterandpower/>

- **Santa Clara Solar Electric Buy Down Program.** Customers receive 40% off the cost of installed photovoltaic system or \$4 per watt.

Contact Information:

Website: <http://www.siliconvalleypower.com/Index.html>

- **SoCalGas Gas Engine Program.** Program participants must be commercial, industrial, or agricultural core customers (tariffs G-10, G_AC, G_EN). Participants receive incentives for replacing or refurbishing existing natural gas fired engines and pumps. Participants receive 10-20% off the installed cost of the new system or \$25-\$50 per HP (whichever is less). Customers in this program are *not* eligible for funding from the SelfGen Incentive Program; however, the target customers for this program and the SelfGen Incentive Program may overlap.

Contact Information:

Website: www.socalgas.com

6.4 Summary of Program Participation

Projects involved with the SelfGen Incentive Program may also be involved with one or more other programs designed to encourage adoption of distributed generation technologies. Information related to participation in these other programs is available from several sources, including SelfGen Incentive Program application forms, host customer interviews, and supplier interviews; tracking data for other programs; and other miscellaneous sources (e.g., press releases, news items). Data from these several sources are summarized below.

Fuel Cells

Data collected during interviews of host customers and suppliers, in combination with information concerning other programs, reveals that the Department of Defense's Climate Change Rebate Program is the most significant other program influencing the economics of fuel cell projects. Active projects are associated with a total of six (6) 200 kW phosphoric acid fuel cells. Of these six units, based on review of Climate Change Rebate Program records, it appears that five are (or are expected to be) recipients of financial support from this federal program.

Available SelfGen Incentive Program application data, which are in electronic format, provide a positive indication of participation in the Climate Change Rebate Program for all of the five units identified by Department of Defense records as being supported by its Climate Change Rebate Program. The data from the SelfGen Incentive Program application forms, as well as information from an interview with a fuel cell supplier, are consistent with Climate Change Rebate Program participation data.

CEC Buydown Program tracking data were also reviewed to check for multi-program participation. This review revealed no instances where SelfGen Incentive Program projects were also involved with the Buydown Program. While fuel cells utilizing renewable fuels are eligible for the Buydown Program, funds for large projects have been unavailable for a

number of months. Only two fuel cells have been installed through the Buydown Program to date. Both of these units were installed in 1999 at a wastewater treatment facility. If additional Buydown funds for large projects become available in the future, there will be a possibility of applicants applying to both the Buydown and SelfGen Incentive Programs.

Photovoltaics

Seven of thirty-nine SelfGen Incentive Program applicants with active photovoltaic system projects identified the CEC's Buydown Program as a source of other project support on their SelfGen Incentive Program application form. In most of these instances, a Buydown Program reservation number was not provided. Independent review of the Buydown Program participation data revealed only one project that appears to be represented in both the Buydown and SelfGen Incentive Program tracking databases and where this fact is not noted in the SelfGen Incentive Program tracking database.

The SelfGen Incentive Program application process did not require disclosure of financial implications of tax credits or low-interest loans. At least one active photovoltaic project appears to be participating in the CEC's ECAA Low Interest Public Agency Loans Program, whose funding source is Assembly Bill 29x. Public records indicate the award amount for this project is \$157,506. During the host customer interviews, at least one other project was identified as being involved with the State Fair Loan Fund. A second additional respondent is in the process of obtaining a CEC Low Interest Loan to cover the capital cost of project(s) in the SelfGen Incentive Program. One of the projects that may be financed through this loan program is a photovoltaic system.

Two of six interviewed host customers with active photovoltaic system projects indicated their intention to take advantage of federal and state tax credits available for new photovoltaic systems in California. The other participants included a municipal utility district, a college, and a state agency. Tax credits may not be meaningful for these types of organizations. Similarly, a respondent involved with a large, inactive photovoltaic system project reported that while tax credits were not valuable to his cooperative organization, he had discussed the possibility of a third party ownership arrangement that could allow a for-profit system owner to take advantage of federal and state tax credit opportunities. Of the five survey respondents with inactive projects, four indicated that they had intended to take advantage of federal and state tax credit opportunities for photovoltaic systems.

Microturbines

Of the thirty active microturbine projects, the SelfGen Incentive Program tracking database identifies other sources of funding for only three projects. The three sources include Department of Energy Technology Grant, CEC Wastewater Distributed Generation, and AQMD Microturbine Giveaway Program. The project associated with the AQMD Giveaway

Program appears to involve multiple microturbine units, two of which are being provided by the AQMD at no charge to the participant. The SelfGen Incentive Program rebate magnitude has been adjusted downward accordingly.

The CEC Wastewater Distributed Generation Program is funded through AB970. While it is not necessary for microturbines supported by the SelfGen Incentive Program to use renewable fuel, the units for this particular project utilize digester gas. Funding from this program corresponded to approximately 29¢/watt. Survey respondents associated with inactive projects described their involvement with several other microturbine support programs, including gas company grants, the CEC’s peak demand reduction program, and the AQMD’s Microturbine Giveaway Program.

Internal Combustion Engines

In the tracking system, three applicants with active projects indicate involvement with other distributed generation support programs. In one of these instances, the other program was the CEC’s Peak Load Reduction Program. However, the customer was unable to satisfy the schedule requirements of that program and so the SelfGen Incentive Program rebate calculation was unaffected. The other two active projects for which another program was identified in the SelfGen Incentive Program tracking system were associated with the “CEC” program, and the rebate magnitude was incorporated into the SelfGen Incentive Program rebate amount. The identity of the precise CEC program was not clearly identified.

Three SelfGen Incentive Program participants with active internal combustion engine projects were interviewed during the course of the process evaluation. All three indicated they were taking advantage of the availability of special loan programs. Two projects are slated to be financed through a low-interest CEC loan program, while the third is being financed through the Safe-Bidco State Assistance Fund for Enterprise, Business, and Industrial Development Corporation.

Summary of Other Programs

Other programs influencing the first costs of SelfGen Incentive Program projects are summarized in Table 6-1. In some instances, the other program is focused on a discrete portion of the total project that is not funded by the SelfGen Incentive Program. In other cases, it appears that final funding levels will be determined after projects develop from early to more advanced stages.

Table 6-1: Summary of Other Programs Influencing First Costs

Technology	Program
Fuel Cells	DoD Climate Change Rebate Program
Photovoltaics	CEC Buydown Program
Microturbines	SCAQMD Microturbine Giveaway Program
	CEC Water/Wastewater Generation Retrofit Program
	DOE Technology Grant
Internal Combustion Engines	CEC Peak Load Reduction Program

6.5 Conclusions

The statewide compliance database is being used effectively (with one possible exception) to identify SelfGen Incentive Program projects that are also supported by the CEC’s Emerging Renewables Buydown Program, or that might be involved with the SelfGen Incentive Program through multiple administrators. In cases where participants have applied to more than one program, it appears that Conditional Reservation magnitudes are based on assumed incentive levels. Only after projects are completed and the incentive claim process is initiated will it be possible to calculate all final reservation magnitudes and assess adherence to program design guidelines. Review of participation data for other programs suggests that SelfGen Incentive Program participants typically are satisfying the program requirement to disclose involvement with other programs affecting end-user first costs. After benefit/cost analysis methods and assumptions are revised, these data, as well as those collected during participant and supplier interviews, can be incorporated into estimates of actual program cost effectiveness.

7

On-Site Field Verification and Inspection Activities

Section 4.3 of Decision 01-03-073 requires that Program Administrators conduct inspections to verify that funded self-generation systems are actually installed and operating. Based on the overall project development status of the 2001 Advanced Stage applicants, there were very few site inspections performed by the Program Administrators at the time of this assessment. In this first year process assessment, the verification activities reported through the Program Administrator interview process are summarized. The second program year evaluation will entail a detailed independent assessment of the on-site verification process and its impacts on the program's objectives will be performed by the contractor team.

7.1 Review of Administrators Verification Activities

Summary

During the Program Administrator interviews conducted in February and early March of 2002, two Program Administrators had participating customers with systems in their program/service area, which were verified to date during early 2002. According to the Program Administrators, additional systems were expected to be verified soon thereafter. Many of the Program Administrators were in the process of standardizing a checklist of measures, selecting a field verification contractor via an RFP, determining the format of the on-site inspection data documents, and determining the method of storing the electric interval data. Program Administrators indicated a need to synchronize with RER on sharing monitoring data on a regular basis. In addition, most of the Program Administrators noted that they will accompany the contractors during the early field inspections to more clearly understand the process and address any customer concerns related to the project verification and metering process.

On-Site Verification Process

An example from one Program Administrator of a proposed process for on-site inspections included the following implementation steps as part of the verification process in their documentation:

- **Pre-Site Inspection Information Gathering.** This process included administrator contact with the contractor performing on-site inspection, scheduling the logistics for the inspection, agreement on the checklist to utilize to document

- tasks and items inspected, and follow-up contact in the event the contractor is refused entry for inspection. The contractor will expedite the on-site inspection by verifying the following information beforehand: system output, proof of interconnection, copy of building inspection report, air permitting documentation (where applicable), final project cost documentation, and proof of warranty.
- **On-Site Interview.** The actual interview involves questions about length of time in operation, problems encountered, plans for demand reduction program, other incentive programs, how the self-generation unit is used (supplement site load or for backup generation), verify offsetting load, verify new or remanufactured, other sites planned for self-generation, percent of natural gas used as fuel cell supplement (where applicable), and data acquisition system capabilities.
 - **On-Site Photographs.** The contractor will photograph applicant heat exchangers and renewable fuel source (where applicable), equipment nameplate rating, interconnection device, and any workmanship issues.
 - **Detailed On-Site Inspection.** This process depends on the incentive level and installed technology. The inspection involves verifying that the equipment is in order and that the equipment listed on the reservation request form matches the actual system in the field. Information analyzed includes manufacturer name, model number, calculations, proper location of system, new equipment verification, proper setup, professional installment, and proof of interconnection.
 - **Post-Site Inspection Documentation.** After the on-site inspection, the contractor will mail the Program Administrator the inspection checklist with supporting documentation and copies of the photographs. The contractor will notify the customer via e-mail that they will receive notice regarding inspection results.

After the on-site verification process is complete, one Program Administrator indicated that its contractor will create a report for the Program Administrators and applicants with information based on inspection findings.

Before issuing an incentive check, the Program Administrators indicated a need to review the claim form for air quality, approval of connection, building permit, that the system was signed off as safe, and that the system was properly inspected.

Summary

Based on the limited verification activity conducted by the Program Administrators for 2001 applications, it appears the process is functioning as intended.

Future Evaluation Activities

During the second year program evaluation, RER will further assess the on-site verification process through 1) host customer and third party surveys, 2) interviews with Program Administrators and their verification contractors, and 3) implementation of a sample of on-site verifications for selected technologies and types of applicants.

8

System Monitoring and Operational Data Collection

Decision 01-03-073 requires Program Administrators to “monitor the extent to which self-generation units installed under this program operate during peak periods.” In addition, the Program Administrators are required within Section 4.8 of the Decision “to perform program evaluations and load impact studies to verify energy production and system peak demand reductions.” Development of information concerning performance and operation of rebated self-generation systems is a critical impact evaluation activity. This project-specific generation system operating information will be used directly in quantitative assessments of the program evaluation criteria used to measure achievement of the California Public Utility Commission (CPUC) Self-Generation Incentive Program (SelfGen Incentive Program) objectives outlined in Table 2-1.

Because there were no completed and paid operational projects reported in the Program Administrator databases at the end of the first program year, these specific monitoring and data collection activities are not the focus of this first year evaluation effort. System monitoring and operational data collection activities will begin in 2002 to support the second year program impact evaluation. These activities will include monitoring of electrical generation by the utilities and monitoring of recovered useful thermal energy by the evaluation team

Data collection efforts for this first year evaluation report focused primarily on process issues. Surveys and interviews of key stakeholders and reviews of program records were conducted to collect data that were used to assess process-related factors such as program status, program implementation effectiveness, and participant satisfaction. Details of the system monitoring and operational data collection activities to be carried out for the second and subsequent year evaluations are described in the Program Evaluation Work Plan (see Section 2 of this report). Participants’ electrical generation interval output data will be provided to RER by the local electric utilities to support the load impact analysis and other evaluation requirements contained within the Decision and the adopted Program Evaluation Criteria.

Beginning in 2002, RER and its evaluation team members will install monitoring equipment at selected sites to collect data necessary to assess waste heat utilization and system

efficiency performance for Incentive Levels 2 and 3. This monitoring activity will be performed for both a random sample of program participants and for selected sites that are estimated to marginally meet the annual waste heat recovery or the overall plant efficiency criteria. RER will coordinate with the Program Administrators and their site verification and heat recovery engineering consultants in the selection of this latter sample frame of Incentive Level 2 and 3 participants. RER and its team will also collect supplemental data necessary to assess reliability impacts and fuel usage requirements of rebated self-generation systems. An overview including the key issues related to these system monitoring and operational data collection activities is presented below.

8.1 Waste Heat Recovery

The monitoring plan to be implemented for the second year program evaluation includes provisions to collect data needed to measure annual useful waste heat recovered from Incentive Level 2 and 3 systems. Principal thermal energy monitoring system components to be used will include a data logger with modem, a telephone line, and thermal energy flow (BTU) meter(s). The energy meter for Incentive Level 2 systems is likely for measuring hot water flows and the temperature change in the working fluid across the heat exchanger. However, Incentive Level 3 BTU metering systems may require steam flow sensors with the delta temperature instrumentation. RER currently anticipates that long-term continuous compliance monitoring will be employed for the sample of Incentive Level 2 and 3 projects selected for the program evaluation. However monitoring systems could be either permanent/long term or short term in nature, depending on the final decisions related to sampling strategy (yet to be determined due to the lack of completed first-year projects).

The long-term monitoring approach would likely involve installation of orifice-plate type flow meters, whereas the short-term monitoring approach would entail, wherever possible, the use of non-invasive ultrasonic flow and surface temperature measurements to speed installation, minimize overall metering equipment costs, and host customer thermal process interruption and related inconvenience. Once a site is selected for thermal monitoring, preliminary site-specific data collection will be followed by an initial site visit, during which the contractor will perform a generation system plant walk-through to collect detailed information necessary to complete the monitoring system specification for the site. The initial on-site data collection visit will be followed by a second visit to install and then verify monitoring system operation and test the system. Collected data will be transmitted via modem on a predetermined schedule to enable regular checks of data quality and monitoring system performance.

8.2 Reliability Requirements

Program eligibility for technologies included under Incentive Level 3 after the end of 2001 entails meeting certain requirements concerning electric system reliability. In early 2002, the program reliability requirements were specified by the CPUC and are effective for projects applying to the program in 2002 on through the end of the program. During the evaluation phase of the program, the evaluation team will review the new reliability-related provisions of the revised program handbook and application materials. These requirements include meeting certain power factor criteria and, for systems greater than 200 kW, notification of planned maintenance activities with the local electric utility. The evaluation contractor will monitor a sample of sites (as data requirements dictate) and assess the degree to which these reliability-related claims are carried out with respect to the operating performance of the program's self-generation systems observed in the field.

8.3 Fuel Use Requirements

Incentive Level 1 fuel cells powered by renewable fuels are required to satisfy certain requirements related to nonrenewable fuel supply. These requirements are similar to those governing the operation of several solar thermal electric/natural gas supplemented power plants currently operating in California. The parameter used to describe the maximum fuel mix for these qualifying dual-fueled renewable generation systems is essentially a *fuel input usage ratio*. Local gas utilities will be responsible for collecting the natural gas usage data of the generation system. Ideally, both renewable and nonrenewable fuel use data will be available to the evaluation contractor. In the event this is not the case, RER and its team will use manufacturer efficiency data, in combination with electric production data from the local electric utility and natural gas consumption data, to estimate the contribution made by (potentially unmetered) renewable fuels. This provides a basis for calculating an estimated annual nonrenewable to renewable Fuel Usage Ratio.

9

System Operational Characteristics by Administrator Service Area

At the time of this first-year assessment, there were no operational data available, and as yet, no completed and paid 2001 applicants in the program. Therefore, RER will not evaluate System Operational Characteristics on a technology and an Administrator Service Area basis until these 2001 and 2002 program applicants have fully complied with all program requirements and when such system operating data becomes available to the evaluation consultant. The operating characteristics will be segmented by the following categories during the second year program evaluation:

- Solar photovoltaic,
- Wind,
- Fuel cells (renewable and nonrenewable fueled assessed separately), and
- Level 3 technologies:
 - Microturbines,
 - Internal combustion engines, and
 - Gas turbines.

10

Conclusions and Recommendations

10.1 Introduction

This first year evaluation of the SelfGen Incentive Program is performed to fulfill specific requirements identified in CPUC Decision 01-03-073 (Interim Opinion: Implementation of Public Utilities Code Section 399.15(b); Load Control and Distributed Generation Initiatives, March 27, 2001). Because so few of the first year projects are currently completed and paid,¹ the focus of this first year assessment has been on process evaluation addressing a number of topics, including: program awareness, Program Administrator marketing, ease of application implementation and efficiency, and related program design issues. As discussed in the work plan within Section 2 of this report, an in-depth assessment of the program to improve peak load impacts on the electric system and process improvements in the future will be performed following the 2002 program year.

To summarize the activity in this initial process assessment, Decision 01-03-073 presented the rationale and goals of the program as listed in Table 10-1 below. Evaluation criteria were then developed for meeting each goal and incorporated into the process evaluation work scope. These criteria were then adopted in ALJ Gottstein's April 24, 2002 Ruling on Schedule for Evaluation Reports.

In-depth interviews were performed of all key stakeholders, including all classifications of participants (early stage, advanced stage, third parties, withdrawn/rejected/suspended), other supply channel entities (equipment manufacturers/distributors/ system integrators) and the four program Administrators. Given the availability of information from the stakeholders and considering the limited implementation of the first year projects, this assessment addresses the degree to which the program's goals and objectives are being met in the first year of the program.

¹ Note that several Level 1 and 3 projects were operational according to the applicants at the time of this assessment.

Table 10-1: Evaluation Criteria of the California SelfGen Incentive Program

Program Goal/Rationale/Objective	Criteria for Meeting Goal
G1 Encourage the deployment of distributed generation in CA to reduce peak electrical demand	C1.A Increased customer awareness of available distributed generation technology and Incentive Programs
	C1.B Fully subscribed participation in program (i.e., total installed capacity, number of participants)
	C1.C Participants’ demand for grid power during peak demand periods is reduced
G2. Give preference to new (incremental) renewable energy capacity	C2.A Development and provision of substantially greater incentive levels (both in terms of \$ per watt and maximum percentage of system cost)
	C2.B Provision of fully adequate lead-times for key Program Milestones (i.e. 90 day and 12 month)
G3 Ensure deployment of clean self-generation technologies having low and zero operational emissions	C3.A Maximum allocation of combined budget allocations for Level 1 and Level 2 technologies
	C3.B A high percentage of Level 1 and Level 2 projects are successfully installed with sufficient performance
G4 Utilize an existing network of service providers and customers to provide access to self-generation technologies quickly	C4.A Demonstration of customer delivery channels for program participation to include distributed generation service providers and existing utility C-I customers networks
G5 Provide access at subsidized costs that reflect the value to the electricity system as a whole, and not just to individual customers	C5.A Demonstrate that the combined Incentive level subscription, on an overall Statewide Program basis (i.e. the participant mix of Levels 1,2, and 3 across Service Areas), provides an inherent generation value to the electricity system (avoided generation, capacity and T&D support benefits).
G6 Help support continued market development of the energy services industry	C6.A Quantifiable program impact on market development needs of the energy services industry
	C6.B Demonstrated Consumer Education and Program Marketing support as needed
	C6.C Tracking of Energy Services Industry market activity and participation in the program
G7 Provide access through existing infrastructure, administered by the entities (i.e. utilities and SDREO) with direct connections to, and the trust of small consumers	C7.A Ensure that program delivery channels include communications, marketing and administration of the program, providing outreach support to small consumers
G8 Take advantage of customers’ heightened awareness of electricity, reliability and cost	C8.A Utilize existing consumer awareness and interact with other consumer education/marketing support related to past energy issues to market the program benefits.

The remaining portions of this section present the major conclusions from this process assessment and then Section 1.1 provides program recommendations for the Program Administrators in moving forward with the second operational year of the program.

10.2 Conclusions from the First Year Process Evaluation

The conclusions drawn from the first year process assessment are organized and discussed according to the major themes presented in this report.

Program Status

Particularly given the shortened timeframe, the 2001 program has been quite active within Incentive Level 1 and 3. The 2001 SelfGen Incentive Program received 262 requests for funding in the form of a Reservation Request Form. Currently active 2001 funding reservations² now account for \$63.5 million of the \$119 million that was budgeted by Administrators for the first year of the program. There has been little program activity within Incentive Level 2 (fuel cells using a nonrenewable fuel). Of the 262 requests there are only four applications currently approved in some form for Level 2 Fuel Cells, requesting \$2.9 million in incentive funds. Therefore, the criterion C1.B has essentially been met on a pro-rated basis.

There has also been a considerable amount of applicant turnover in the first year, with nearly 40% of the 2001 projects and 43% of the total project kW capacity moving from an active to some form of inactive status, according to Program Administrator data as of March 2002. There are currently more inactive 2001 Incentive Level 1 projects than active projects. However, when surveying the host customers associated with these inactive projects a high percentage of these customers simply plan to re-apply to the program for various reasons (could not meet the 90 day PPA milestone, want to implement a competitive bid process, etc.).

Participant Characterization

One element of the first year evaluation included developing a market segment profile of program participants. Nearly every major building type was represented among the 2001 host customers, including those in the industrial, commercial, TCU, agriculture, and multi-family residential sectors. Based on the surveys, the commercial sector accounted for the most projects. These projects were spread evenly across several commercial building types (offices, schools, colleges, lodging, and miscellaneous commercial). The industrial sector's projects were concentrated on manufacturing facilities, which were the most represented building type of all the sectors.

Third party applicants represented nearly three quarters of the 2001 SelfGen Incentive Program applications. These third party applicants consist primarily of ESCOs, energy consultants, and contractors. There are a small number of third party applicants that

² Note that these “2001 applications” for funding reservations included the period June through December due to the mid-year initial implementation of the Program.

dominate the funding reservations for photovoltaic and internal combustion engine projects; for each of those technologies, the leading third party applicant had more than twice the number of applications of its closest follower. There was also a clear manufacturing leader for each technology, with the leading manufacturers of photovoltaic modules, fuel cells, and microturbines each accounting for nearly twice the number of projects as their closest competitors. This market domination was not true for the internal combustion engine market, although there was still a clear leader for these systems.

Process Evaluation

Effectiveness of Joint Delivery Implementation

The chief finding regarding the implementation approach is that regional administration of the program is believed to work better than a centralized statewide approach. There is agreement on this issue across administrators, supply channel program applicants, and third party services providers.

Program Operational Efficiency Issues

Interview-based discussions were held with host customers, third party applicants, and Program Administrators on five specific issues relating to the program's delivery and operational efficiency. These issues and their related program evaluation criteria presented in Table 10-1 include:

- Familiarity with, and clarity of, the applicant materials and instructions (C.1.B),
- Responsiveness of program administrators to applicants' questions (C.1.B; C.2.B),
- Does any lack of responsiveness to questions by administrators or third parties lead to delays in the application process? (C.2.B; C.3.B),
- Adequacy of the SelfGen Incentive Program application 90-day proof of project advancement and one-year project completion requirements (C.2.B; C.4.A), and
- Level of ease/difficulty of system installation and meeting application milestones (C.2.B; C.3.B).

Familiarity with and Clarity of the Applicant Materials and Instructions

The vast majority of host customers review the application materials. Even those who claim to be uninvolved more often than not take the time to review the application and instructions. The host customers who found the forms and instructions to be clear ranged from a low of 64% for the *uninvolved applicants* to a high of 91% for the *involved applicants*.

The third party applicants were assumed to be familiar with the application material and generally perceived the application material to be clear and satisfactory. There was some difficulty, mostly for the internal combustion systems, during the first few months of the

program regarding the eligibility of certain heat recovery systems for cooling. This was finally clarified under Decision 02-02-026 on February 7, 2002.

Program Administrators conveyed that the most time consuming part of their jobs is educating interested consumers and applicants. Consequently, some Program Administrators created additional materials to help applicants complete the forms. These included reservation checklists, answers to frequently asked questions, application instructions, and a waste heat recovery worksheet. In addition, Administrators suggested a number of other potential additions to the application materials. Most notably, these included a step-by-step guide in understanding electrical terms (watts/kW/MW) and how to interpret utility bills. Program Administrators were also in agreement with the host customers that the application process and forms should be simplified to save time and expedite applications.

Responsiveness of Program Administrators to Applicants' Questions

Host customer survey respondents overwhelmingly stated that the Program Administrators were responsive and provided satisfactory answers to their program related questions.

Lack of Responsiveness to Questions by Administrators or Third Parties in the Application Process

Very few host customers indicated that there were any unnecessary delays caused by either the third party or the program administrators or both. This was also the case for third party applicants as well. Of the few host customers who indicated they experienced delays, it was usually due to the difficulty in obtaining interconnection agreements with the utilities.

Adequacy of the SelfGen Incentive Program application 90-day and one-year requirements

More than half (55%) of Early Stage respondents indicated that the 90-day proof of project advancement requirement was too stringent. Those with internal combustions and fuel cells reported the greatest difficulty with this requirement. In contrast, only 23% of Withdrawal/Suspension/Rejection respondents indicated that the 90-day deadline was not sufficient. This is consistent with the 10% of the same group indicating that their application was withdrawn/suspended/rejected because of not meeting the 90-day deadline.

Contrary to the 90-day deadline, the majority of applicants believe the one-year equipment installation requirement to be sufficient.

Third party applicants' responses to the 90-day deadline adequacy were quite varied both among the incentive categories and among the application stages. Notably, internal combustion system applicants found this requirement very difficult to meet for a variety of reasons. In contrast, the third party applicants generally believe the 1-year deadline to be sufficient.

Administrators, conversely, overwhelmingly support the 90-day deadline because it expedites the project development process and eliminates unrealistic project applications. Also in contrast, the majority of Program Administrators believe that some applicants (schools and governments) need more than one year to get equipment installed due to the time it takes them to get internal approvals.

Level of Ease/Difficulty for System Installation and for Meeting Application Milestones

Early stage respondents combined with advanced stage respondents indicated that the top two most difficult milestones to reach were obtaining interconnection agreements and obtaining air emissions permits. Because they were generally not as far along the development path as their counterparts, the Withdrawal/Suspension/Rejection respondents indicated providing detailed cost estimates and selection of a manufacturer as the two most difficult.

Program Administrators were consistent with the host customers in their perception that interconnection agreements presented difficulty. However, the Program Administrators were more extreme in their perceived judgment of the degree of difficulty of several milestones. Program Administrators placed more difficulty on waste heat recovery calculations and less difficulty on obtaining air emission permits than host customers.

In addition to areas of difficulty, survey respondents were asked about the likelihood of their projects being completed. The Early Stage respondents were very optimistic that they would get their systems installed. Interestingly, over half of the Withdrawal/Suspension/Rejection respondents indicated that their projects are still likely to be installed.

Program Acceptance and Satisfaction

Program acceptance and satisfaction is reasonably high across all host respondent groups. However, third party respondents rated program acceptance and satisfaction slightly lower at 3.7, based on a maximum rating of 5.0. Given that the third party respondents often play the dual-role of program applicant and project development prime contractor, their expectations of program support functions are likely to be greater than those of host customer applicants.

Program Awareness

Host Applicants appear to find out about the SelfGen Incentive Program via a third party distributor or directly from a utility representative rather than through administrators' marketing activities.

Nonparticipants are finding out about the SelfGen Incentive Program from slightly different sources of information than the other applicants. Nonparticipants are more apt to find out about SelfGen Incentive Program via administrators' marketing activities, yet are not

changing their behaviors and applying to the program. It appears that customers working with a third party may have an easier time with the application process.

The current Program Administrator marketing programs appear to be reaching, but not necessarily impacting nonparticipants. Marketing activities that are reportedly more effective include utility representative custom consultation directly with targeted customers and program workshops to improve informed awareness. Increasing support from the administrators by way of workshops, providing literature to third parties that they can share with their potential customers, involving utility account representatives and rolling out a wide-scale marketing campaign will likely increase awareness of the program.

Administrator Marketing Efforts

The SelfGen Program Administrators are using a number of marketing mediums in their efforts to fully subscribing the program.

- Workshops
- Web Site Marketing
- Telemarketing
- Targeted Marketing
- Press Releases
- Marketing Plans
- Industry Report
- Account Executive Incentives
- Direct Mail
- Collateral Materials
- Print and Radio Advertising

The degree of marketing has clearly varied across the four Program Administrators. The total dollars allocated to first year marketing efforts has ranged from 0.13% to 7.5% of incurred administrator costs. Some administrators appear to have placed a greater emphasis on marketing the Program than others. The third party applicants indicated some concern regarding the overall effectiveness of the administrators' marketing efforts. However, in fact they themselves were found to be one of the main sources of marketing information for the SelfGen Incentive Program, according to both the administrators and the host applicants.

Although the majority of marketing programs implemented by the administrators have resulted in an increase of awareness for the appropriate market, in some cases the marketing programs were ineffective. Some events have not been as successful since there was a lack of actionable leads.

Mass marketing such as utility bill inserts and radio advertisements may not be as effective in targeting the appropriate audience since the SelfGen Incentive Program does not apply to everyone. The SelfGen Incentive Program message resonated more effectively with equipment suppliers than with consumers. The third party marketing activities provide support of the goal to utilize an existing network of service providers and customers to provide access to self-generation technologies quickly.

Effectiveness of Program Design upon Removing Market Barriers

Implementing a SelfGen Incentive Program is a multifaceted task and this high level of complexity may well limit market potential. The program's eligibility requirements ensure deployment of clean self-generation technologies having low and zero operational emissions, consistent with AB970 ruling. However, these requirements sometimes limit an applicant's ability to implement a project.

In an effort to reduce implementation and market barriers, program administrators have created supplemental information to increase awareness about the program, more clearly explain how to meet waste heat requirements, and better understand the application process. In order to increase adoption rates, the barriers related to cost, reliability, and risk aversion to fuel cells needs to be addressed. Increased marketing or increased incentives will help drive the market and lowering the costs and improving the ease of installation may help reduce these fuel cell market barriers further. However ensuring that the supply channels are ready to move this market forward and provide the needed consumer confidence in the form of extended warranties and reasonable maintenance contracts is also critical to addressing these barriers from the consumer's perspective.

Financial constraints can be resolved using an incentive payment to offset initial costs. In nearly all cases for Level 1 and 2 projects and in some instances for Level 3 projects, the incentives provided by the program are critical to the economic viability of the installations. The program is generally regarded as effective in promoting self-generation technologies and creating an incentive for host customers to consider these systems as viable opportunities. Many Level 3 suppliers claimed that their systems are generally economic without the incentive. However, the incentive payments are still important in getting the host customers to consider self generation at their site.

Effectiveness of Program Design Upon Leveraging Market Incentives

The SelfGen Incentive Program currently allocates one-third of the incentive budget to each of the technology levels. Budget reallocation from renewables to nonrenewables requires approval via an advice letter filing from the CPUC. This is a reasonable policy, since it is consistent with the enabling legislation AB970, requiring that utilities give preference to incremental renewable energy capacity. Opponents of the approach argue that the goal of

reducing load will be infringed upon due to the administrative difficulties involved in shifting funds from undersubscribed technologies, such as photovoltaic or fuel cells operating on renewable fuel, to oversubscribed nonrenewable generation categories. However with the clarification of the treatment of annual program overruns and under spending in Decision 02-02-026, Program Administrators may now file an advice letter requesting the use of the next program year budget if current year participation is greater than expected. Therefore, Program Administrators now have an additional option, should the CPUC not approve the transfer of the current annual budget allocation from renewable to nonrenewable technologies.

Some of the Program Administrators agree that Level 3 and some Level 1 (PV) incentives are too high, and that Level 2 incentives are likely too low to move the market for fuel cells operating on nonrenewable fuel. Program free ridership was reported by some of the third parties implementing Level 3 projects.³ There is no indication of free ridership with the Level 1 technologies as reported during this first process evaluation.

Other Incentive Program Participation

Projects involved with the program may also be involved with one or more other incentive programs designed to encourage adoption of distributed generation technologies. Information related to participation in these other programs is available from numerous sources, including SelfGen Incentive Program application forms, host customer and supplier interviews; tracking databases for other programs; and other miscellaneous sources.

Based on our review of the available information sources, it appears that the statewide compliance database is being used effectively to identify SelfGen Incentive Program projects that are also being supported by the CEC's Emerging Buydown Program, or that might be involved with the SelfGen Incentive Program through multiple administrators. In cases where participants have applied to more than one program it appears that conditional reservation magnitudes are based on assumed project capacity and incentive levels. Only after projects are completed and the incentive claim process is initiated, will it be possible to calculate all final reservation magnitudes and assess adherence to program design guidelines. Review of participation data for other programs suggests that SelfGen Incentive Program participants typically are satisfying the program requirement to disclose involvement with other programs affecting end user first costs.

³ A free rider is defined as a project participant that would have implemented the same project in the absence of the program's incentives.

10.3 Program Recommendations

This first year process assessment provides two general types of recommendations for the program. These include recommendations regarding program design issues and process-related recommendations for Program Administrators to consider in their statewide Working Group planning and coordination efforts to improve program effectiveness and implementation efficiency.

Program Design Recommendations

Given the level of application activity in the first year of the program, the basic structure of the incentives design appears to be valid and producing desired results to date. The relatively high level of applicant turnover (i.e., rejected, withdrawn and suspended applications) in the first seven months of the program however indicates a need for some fine tuning in the program design and/or applicant implementation processes. Several potential recommendations to improve the design of the SelfGen Incentive Program design are revealed during this first-year evaluation. These include two areas of the assessment: 1) The Effectiveness of Program on Removing Market Barriers, and 2) The Effectiveness of Program on Leveraging Market Incentives

Effectiveness of Program Design upon Removing Market Barriers

The inability for a consumer to access adequate unbiased information about self-generation technologies or obtain competitive bids for their project, may result in reduced system quality and/or higher project implementation costs. As a result, self-generation projects may not be achieving the maximum peak load reduction for the Program and applicant's level of investment. The statewide Working Group should combine its technical information resources and provide a centralized web-based self-generation information clearinghouse that directly provides customer applicants information needed to assess the appropriateness of the application and summarized data regarding the average/median installed costs of the most common types of self-generation projects.

It is also recommended that Program Administrators include language in their program marketing and an application material that strongly recommends to host customers and third-party applicants that they should secure two or more competitive bids for their complete generation system and its installation, including any required extended maintenance or warranty. This combined approach of improving technology and system procurement practices information dissemination will have the effect of increasing the informed awareness of host customers regarding their acceptance of sole-source third-party applicants without adding further administrative requirements to the Program.

The Working Group should also consider modifying the program application form to include: 1) high-level project bid data for an alternate system provider (i.e., bidder name/contact information, total bid price, gross system generating capacity) and 2) a signed waiver by the applicant should they elect not to obtain competitive bids for their system or equipment.

Effectiveness of Program Design Upon Leveraging Market Incentives

The SelfGen Incentive Program offers a one-time cash incentive in an effort to reduce peak demand on the electric grid. The current approach is focused on addressing high capital costs and lack of consumer interest in the self-generation option. In addition, the three-tiered incentive level structure is designed to encourage the deployment of low and zero emissions generation technologies. The program guidelines do not allow other state-level distributed generation program incentives funds, such as the CEC’s Emerging Buydown Program, to be added to the SelfGen Incentive Program amount for any applicant funded through the program. This requirement can help ensure that the limited available Program incentives are distributed to the greatest amount of generation capacity and that projects continue to require a substantial investment by the customer or system owner.

However, in the case of local, federal, or other private sources of market incentives, these funds are simply deducted from the eligible system costs in determining the program incentive. This interactive incentive approach with non state-funded programs increases the total potential funding received by eligible projects, which may have a positive deployment impact on distributed generation technologies with higher capital costs or perceived technical risks (e.g., fuel cells, photovoltaics, and small wind turbines). If such incentive funding is available for the lower capital cost (i.e., Level 3) distributed generation technologies, they will typically not require these added incentives from other programs to be considered economic by project developers/owners. Therefore, it is recommended that the treatment of *non-state other program incentives* for all Level 3 technologies be modified to be identical to other state-funded programs (i.e., Other local/Federal/Private Program incentives are directly deducted from the calculated Self-Gen Incentive). Implementing this revision would however, complicate, and not simplify the program application materials, thus providing further potential confusion by host customers and third party applicants.

Given the self-reported level of Incentive Level 3 free ridership by third parties and that the vast majority Level 3 incentives were based on eligible system cost,⁴ the issue of whether the Level 3 incentive (\$/watt and % of eligible cost) should be reduced needs to be addressed through further study. This assessment should be based upon reported implementation costs, self-reported project developer investment hurdle rates and by tracking the success of these

⁴ According to the Administrator’s statewide 2001 Program Data, 94% of the active internal combustion engine applicants and 87% of the active microturbine applicant incentives are based upon eligible system cost.

first year projects through the second program year. As the self-generation market increases in size over time, this action will have an impact on the total leveraging of the program's available funds.

Likewise, although there was no reported free ridership with the Level 1 incentive applicants, it is clear that medium- and large-scale photovoltaic eligible project costs have increased over the past several years since the CEC Emerging Buydown incentives were raised from \$3.00 to \$4.50 per watt. Given the lack of other reported drivers and a rapidly expanding market, this noted increase in installed costs in the larger PV systems may well be a direct result of the increase in available program incentives. Reducing the Level 1 incentives slightly may have the longer-term impact of further leveraging the program funding for Level 1 renewable technologies. In addition Level 2 (and Level 1 – Fuel Cells) incentives appear to be too low to impact the market, although it is not clear whether consumer perception of other *technology risk factors* simply outweighs the benefit of the current incentive levels. If this technology commercialization/consumer perception is the key issue, then increasing the program incentives for fuel cells will have little effect on Incentive Level 2 program participation. It is recommended that further analysis be performed by the CPUC Energy Division to determine the optimum incentives for the program, given its stated goals and objectives.

Process Recommendations for the Program Administrators Working Group

The vast majority of participants and third parties indicated that the Program Administrators were doing an excellent job in reviewing and processing their applications to date. However, a number of process-related improvements were either directly suggested or inferred through stakeholder input and deserve further consideration in future program planning and implementation improvement efforts. These process recommendations are grouped into three major categories: 1) Administrator Program Tracking Database 2) Implementation Efficiency, and 3) Program Marketing.

Administrator Program Tracking Database Recommendations

Each Program Administrator has devoted considerable resources to their project tracking systems. Each tracking system was designed to aid in the administration of the program, and they all serve that purpose very well. Unlike the Program Administrators, however, outside evaluators do not have direct day-to-day knowledge of each project; the only project-level details available to those parties are in the Program Administrator tracking data.

To efficiently track participants on a *statewide* basis, and to consistently characterize *all* projects and participants, we propose that the Program Administrators complete the following:

- Standardize the variables used to report the status and stage of a project,
- Include additional variables in the Program Administrator tracking data, and
- Provide RER with quarterly updates of the Program Administrator tracking data.

The following discussion includes suggestions for accomplishing these goals.

Standardizing the Stage and Status of SelfGen Projects

To aggregate project data across Program Administrators, we propose a standard categorization scheme for both the stage of the application (how far along they are in the process), and the status of the application (whether it is active, withdrawn, or rejected, each of which could be true at any stage). While there has been some correspondence among Program Administrators regarding the necessity of standardizing these variables, such standardization was not in place as of the first quarter of 2002. Based on the design of the program, we would suggest classifying applications as follows:

STATUS

- *Withdrawn*: applications that have been cancelled by the applicant. For those that have re-applied, there would be a separate variable indicating that a new application has been submitted for this project.
- *Rejected*: applications that have been cancelled by the administrator. For those that have re-applied, there would be a separate variable indicating that a new application has been submitted for this project.
- *Active*: applications that have not been withdrawn or rejected

STAGE (applicant would be categorized according to the latest stage reached)

- Complete Reservation Request Form (including all supporting documentation) has been received from the applicant (i.e., the application is under review): “*RRF received*”
- Conditional Reservation Letter has been sent to applicant (i.e., a conditional reservation has been issued): “*CRN sent*”
- Complete Proof of Project Advancement (including all supporting documentation) has been received from applicant: “*PPA received*”
- Reservation Confirmation and Incentive Claim Form has been sent to the applicant (i.e., the reservation has been confirmed): “*RCICF sent*”
- Complete Reservation Confirmation and Incentive Claim Form (including all supporting documentation) has been received from the applicant (i.e., incentive has been claimed): “*RCICF received*”
- On-site verification has been conducted: “*On-site verification complete*”
- Incentive check has been issued: “*Check issued*”

Additional Tracking Variables

RER has compiled a list of variables that would aid in future participant characterization efforts that either (a) are not currently provided by any Program Administrator, or (b) are currently provided by only some of the Administrators. Table 10-2 contains the list of these variables, along with a description of how it would help in the Evaluation effort and where the variable could be obtained.

Most of these variables would primarily aid future process evaluations. For example, obtaining the NAICS code, annual peak, and monthly consumption for *every* host customer, along with the dates of completed milestones, would allow the project team to determine how host customer characteristics affect the speed of project implementation. Such an analysis could aid in future program design/redesign efforts. Most of these additional variables could be obtained directly from the Reservation Request Forms submitted by the applicants, through normal correspondence with the applicant, or from customer databases already kept by each utility.

Table 10-2: Suggested Additional Program Tracking Data Variables

Description of Variable	Why the Variable is Needed	Possible Source for the Variable
SIC or NAICS Codes for all Host Customers	Provides a standard way of characterizing business types involved with the Program; provides a verification of the building type obtained from surveys of Host Customers.	Customer account database kept by each utility; or the Reservation Request Form could include a field for this information.
Host Customer Address, contact person, and phone number	Location for field verification; contact information for surveys; also provides information about the geographic dispersal of Third Party applicants' projects.	Reservation Request Form
Dates for all of the following milestones: <ul style="list-style-type: none"> ■ Receipt of Reservation Request Form in its entirety, including all supporting documentation ■ Mailing of Conditional Reservation Notice Letter ■ Receipt of Proof of Project Advancement in its entirety, including all supporting documentation ■ Approval of Proof of Project Advancement ■ Receipt of Reservation Confirmation and Incentive Claim Form in its entirety, including all supporting documentation ■ On-site inspection(s) ■ Incentive Payment 	Provides a way to track the typical time required for each stage of the project development process; this helps determine if project delays are correlated with certain business types or other project-level characteristics	Correspondence with the applicant
Date that a project is officially cancelled (withdrawn or rejected)	Provides a time-series of withdrawals and rejections	Correspondence with the applicant
Primary reason that a project is cancelled	Helps identify potential problems with program design	Correspondence with the applicant
Eligible installed cost for the generating system	Allows comparison to costs of projects not in the SelfGen Incentive Program, to determine if program incentives increase the cost of a project	Reservation Request Form and correspondence with applicant
Annual Peak Demand	Allows estimation of peak-demand impacts of SelfGen projects not yet complete.	Customer account database kept by each utility
Basis of Incentive (i.e., \$ per watt, or % of cost) ⁵	Helps evaluate the incentive structure	Reservation Request Form
Monthly electric consumption, in kWh and dollars	Allows estimation of the actual output of the SelfGen system, for those systems not yet complete; helps characterize the Host Customers for process evaluation efforts.	Customer account database kept by each utility

⁵ This could be inferred from the incentive amount, capacity, and total cost variables; however, there would be less chance for error if the tracking data indicated the basis.

Proposed Schedule for Administrator Tracking Data Updates

RER proposes the following quarterly schedule for receiving tracking data updates from the Program Administrators:

- July 31, 2002 (including all applications received through June 30, 2002),
- October 31, 2002 (including all applications received through September 30, 2002),
- January 31, 2003 (including all applications received through December 31, 2002),
- Continuing through the term of the program.

It may also be useful to have the Statewide Compliance Database updates and Administrator tracking data updates coincide; however, the Compliance Database does not include (or require) all the variables in Table 10-2.

Implementation Efficiency Recommendations

There are a number of recommendations related to program implementation effectiveness and efficiency. These include the following:

Effectiveness of Joint-Delivery Administrator Implementation

Although the regionally based Program Administrator implementation approach appears to be functioning quite well, several recommendations are suggested to improve the existing joint-delivery approach. These include the following.

- Create a commonly developed web-based electronic Program Application system for all Program Administrators to install on their existing program websites that will help to automate common processes and streamline the application process.
- Modify the existing Program Administrators forum (statewide Working Group) to expand the objectives regarding the reviewing available technical information resources and discussing administrator-specific implementation approaches.
- Utilize a central *Call Center* to answer pre-applicant stage common program questions and concerns, in particular, screening basic applicant program issues required before applying to the program. The call center should also be used as a referral for those potential applicants moving forward and needing to speak to a Program Administrator.
- Push for greater consistency in areas where application requirements (e.g., utility service and electric interconnection agreements) are not currently consistent, but can be made more consistent.

Familiarity with and Clarity of the Applicant Materials and Instructions

The host customer participants suggested three notable improvements to the overall application process. These improvements include:

- Creation of a checklist of program requirements for each stage of the application process,
- Simpler application materials, and
- Simpler (and easier to understand) application instructions.

Although this may be existing policy for some Program Administrators, it was suggested by participants that one person in each Program Administrators office be *assigned to each applicant* as their “customer service representative” to facilitate addressing all application process questions and required clarifications.

Adequacy of the SelfGen Incentive Program Application 90 day and One year requirements

Although the majority of Early Stage respondents felt that the initial 90 day Proof of Project Advancement (PPA) did not provide sufficient time to meet the program’s requirements, we do not recommend that this milestone be extended at this time. Rather RER recommends that more direction and guidance be made available to these potential applicants - *before they apply to the program*. This objective could be achieved through: 1) Administrator’s marketing materials, 2) the above recommended checklist of program requirements, or 3) through a revised set of criteria that would consider a submitted application “fully complete” (i.e., by adding one or more of the requirements for PPA to the initial application acceptance process – such as the submittal of the air permit application and/or the electric interconnection agreement.

Program Marketing Recommendations

Several recommendations will improve program awareness and increase the number of informed qualified applicants. These awareness and marketing related recommendations are summarized below:

- Increase utility account executive/representative involvement with the SelfGen Incentive Program.
- Improve internal communication and awareness of the program within the affected utility operating departments.
- Continue to educate third party distributors via workshops on SelfGen Incentive Program.

- Increase global marketing via direct mail and advertising to increase nonparticipant awareness of the SelfGen Incentive Program.
- Strengthen marketing messages so that nonparticipants hearing about program will be more apt to take some action leading to a program application.

The bottom line is that the Program Administrators need to implement Program marketing activities that will 1) have an effect on the number of applications, and 2) implement process changes that will ease the overall application and project implementation process. By focusing more energy on increasing informed awareness of utility account executives and third party entities by providing them with useful information, the Program Administrators will be able to leverage their existing network of providers through methods of communication that are currently providing results.

Future Evaluation Needs

The evaluation of the SelfGen Incentives Program is discussed within Section 2 (Work Plan) of this report. The next major task in this program evaluation will involve the installation of monitoring equipment (where not previously installed by program applicants for performance measurement/contract billing purposes) and the collection and analysis of this data on a regular basis from those 2001 projects that are now operational. At the end of the 2002 Program Year, RER will initiate the peak-load impacts and second year process assessment of the program. In addition, during the second quarter of 2003, the Program Administrator Comparative Assessment Report will be developed and submitted to the CPUC.